

**Review of USAID's Natural Forest
Management Programs in
Latin America and the Caribbean**

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Review of USAID's Natural Forest Management Programs in Latin America and the Caribbean

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Acronyms

AIMEX	Associação da Indústrias Exportadoras de Madeiras do Estado do Pará
BIOFOR	Biodiversity and Fragile Ecosystems Conservation and Management (USAID/Peru)
BOLFOR	Bolivian Sustainable Forestry Project (USAID/Bolivia)
BOSCOSA	Forest Conservation and Management Project (USAID/Costa Rica)
CADEFOR	Amazonian Center For Sustainable Forest Enterprise, Bolivia
CARE	Cooperative for Assistance and Relief Everywhere
CIFOR	Center for International Forestry Research
COHDEFOR	Honduras Forestry Development Corporation
CONAP	National Council on Protected Areas, Guatemala
CTO	Certified Tradable Offset
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantity Contract
ESNACIFOR	National Forestry School of Honduras
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization of the United Nations
FDP	Forestry Development Project (USAID/Honduras)
FORESTA	Forest Resources for a Stable Environment (USAID/Costa Rica)
FPEI	Forestry Private Enterprise Initiative (USAID)
GIS	geographic information system
IBAMA	Brazilian Environmental Institute
ICAITI	Instituto Centroamericano de Investigaciones Tecnológicas (defunct)
IKONOS	European satellite imagery company
INRENA	National Institute of Natural Resources, Peru
INTECAP	Instituto de Tecnología y Capacitación, Guatemala
IPF	Intergovernmental Panel on Forests
IRG	International Resources Group
ITTO	International Tropical Timber Organization
LAC	Latin America and the Caribbean
LAC/RSD/E	Environment Unit, Office of Regional Sustainable Development, Latin America and Caribbean Bureau, USAID
LKS	lesser-known species (timber)
MAYAFOR	Maya Forest project (USAID/Guatemala)
NFM	natural forest management
NGO	nongovernmental organization
NTFP	non-timber forest product
PROARCA	Regional Environmental Program for Central America (USAID/GCAP)
RENARM	Regional Environmental and Natural Resources Management Project (USAID/GCAP)
RIL	reduced-impact logging
SINAC	National System of Conservation Areas (Costa Rica)
SUBIR	Sustainable Use of Biological Resources (USAID/Ecuador)
TFF	Tropical Forest Foundation

UAC conservation area unit
UNCED United Nations Conference on Environment and Development
USAID United States Agency for International Development

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This report owes its existence to many contributors and supporters. In each of the six countries visited by the Assessment Team, we had excellent logistical support from USAID/Missions, private timber industries, and local NGOs working in projects of natural forest management. We interviewed more than 170 people during the course of this review. Over 70 participants interacted with the Assessment Team on our preliminary findings at a three-day workshop in Santa Cruz, Bolivia (September 2001). Two informal gatherings of USAID officials and NGO forestry specialists were held at IRG headquarters during the past year to share findings and test recommendations. Besides the assessment team, several improvements have been incorporated in this document. Jan Laarman, Juan Sève, Leticia Orti, and reviewers from the Forest Management Trust all provided valuable revisions for which we are thankful.

John McMahon of USAID ably guided the team through this exercise and accompanied the team in the visits to Brazil, Ecuador and Peru. Christy Johnson and Art Blundell of USAID traveled with the team to Brazil and Bolivia. Jeff Brokaw and Christy Johnson also provided valuable comments and support throughout. To all, we are grateful.

Executive Summary

During the 1980s, major concerns were raised about the threats and consequences of deforestation, especially in the developing countries. Bilateral and international aid agencies responded with programs and projects to attempt to arrest deforestation, and to protect and manage forests in sustainable ways. In this context, Latin America and the Caribbean (LAC), with approximately 25 percent of the world's forest and more than 50 percent of the world's tropical forest, became a focus for a number of USAID's activities in natural forest management (NFM). The assessment team defines natural forest as a self-sustaining natural ecosystem that provides both ecological and economic values to society. This assessment reviews USAID's support for NFM in Bolivia, Brazil, Costa Rica, Ecuador, Guatemala, Honduras, and Peru. Investments in the projects reviewed in this report summed to approximately \$145 million over the last 15 years.

Within USAID's missions in the region, the Assessment Team noted considerable ambivalence about forestry in general and NFM in particular. This concern, in part, may be the result of misconceptions about Section 118 of the Foreign Assistance Act of 1961, which establishes the parameters for setting US government programs and policies dealing with tropical forests. It may also stem from the fact that dialogue on forest policy and management among donors, public and private stakeholders, and communities in LAC is still at a fairly early stage, and tends to be fragmented and polarized.

USAID has an opportunity to improve the quality of and participation in this dialogue and, for strategic reasons, we believe the Agency should increase its efforts to create opportunities for dialogue among stakeholders. In addition, USAID should develop outreach efforts using information campaigns, media programs, and policy discussions about forest management. Interventions that help with dialogue, education, and negotiation will be needed for quite some time.

In the course of this assessment, a wide spectrum of stakeholders provided insights on achieving tangible results in NFM, to the benefit of this report. In the main text, the Assessment Team's findings and recommendations are presented under four categories: policy and institutional development, forest management, business and market development, and social and community development.

The recommendations synthesize the insights gained during the assessment and suggest areas for further development of action strategies on the part of USAID. To facilitate prioritization, in the conclusions and executive summary these recommendations have been reorganized under crosscutting categories—**design and implementation of NFM projects**, **training in NFM**, and **NFM-related technical assistance**. The recommendations are summarized below. The main text details the case materials and conclusions that informed these recommendations.

Recommendations for the design and implementation of NFM projects

- There is a need to **identify and take advantage of windows of opportunity in situations presenting favorable political and economic conditions**, whether due to changes in policy, legislation, regulations or institutions. USAID has been extremely effective with the timing of its initiatives in situations where there has been an evident will to implement policy changes, as shown by USAID’s experiences in Bolivia and Brazil.
- The design of **pilot projects should explicitly consider the potential for expansion of these projects into larger-scale commercial ventures**. Considering the potential for pilot projects to become full-size operations in the future provides a long-term perspective from the project’s inception.
- Project **design teams should analyze potential incentives to interest stakeholders in long-term investment in NFM**. These include basic institutional reforms in tenure rights and capacity building, full valuation of forest products and services, marketing of certain environmental benefits and payment for non-marketed services.
- **NFM projects must continue to promote local participation** in all key decisions throughout the design and implementation stages of NFM activities. Local and indigenous communities’ knowledge and beliefs toward land use must also be incorporated.
- NFM project design should **consider the development of “clusters”** between buyers and sellers along the continuum from the forest resource to the end-user. These clusters (which may include forest-based communities, small and medium-sized enterprises and major wood product companies) facilitate economies of scale and offer increased market security and efficiency.
- NFM projects should **encourage governments to clarify tenure rights and obligations** regarding individuals, communities, local governments and central government agencies. Clarity of rights, as well as mechanisms for conflict resolution regarding tenure of resources, are fundamental to success, as shown by experiences in Bolivia and Peru.

Recommendations for further training in NFM

- **Training remains a key priority for communities** if they are to be successful in implementing NFM. Training efforts should focus on the development of business and organizational skills that will enable communities to engage in business responsibly and effectively, and to ensure that community organizations will have the skills to continue activities after the completion of project assistance.
- **Public officials responsible for NFM need strengthened skills in general management, governance, and technical fields**. Training in these areas would help overcome the weaknesses of many institutions governing the forests in LAC, improving these agencies’ ability both to serve constituencies and to help ensure the continuity of NFM policies and practices.

- Training efforts in NFM must **stress linkages with forest-based industries**, and should include managerial, technical and field personnel in communities, business enterprises and government agencies. Linkages between the forest resource and the manufactured products created from it need to be well understood by professionals and stakeholders.
- **Combine training in technical aspects of NFM with training to build capacity in business skills.** This training approach aims at helping transform forest-based enterprises from those with short-term goals of extracting trees for quick gain to those with a longer-term perspective that includes concepts such as value-added and investment in long-term productivity.

Recommendations for further technical assistance in NFM

- **Actively promote criteria and principles for certification of best management practices for NFM.** Independent certification has been a major force in increasing the area under NFM in the LAC region.
- There is a **need for better understanding of forest resources outside protected areas** and for policies that will balance conservation and use of these resources. Expanded support for geographic information systems should be a way to develop and enrich the knowledge base and improve the quality of information used in decision making, whether by policy-makers or forest managers.
- Further work needs to focus on **identifying critical watersheds and defining the respective management roles and responsibilities** of public authorities, private owners, and communities. Given the importance of watersheds in maintaining stable water flows and mitigating impacts of disasters, efforts to protect watersheds must continue.
- **Increase support for knowledge management and dissemination of NFM information and lessons learned**, especially through formats such as databases and electronic discussion lists. Training in information technology and the use of media resources should be directed at forest administrators, enterprises, small landowners, and community leaders.
- **Conduct and incorporate technical assistance in market analysis during the project design stage.** A much deeper understanding of forest products markets and their dynamics is necessary in order to improve the access to markets of both buyers and sellers.
- As demand for wood continues to increase while traditionally marketed tropical species become less available, there is a need to **reengage in research, development, and extension of lesser-known species.** Increasing the marketability of these species may lead to higher profitability for NFM and reduce the excessive harvest of traditional woods.

The last portion of this document places these recommendations in the context of natural forest management as a complex and challenging field. The context also includes the fundamental conditions regarding rights, markets, and overall policies that must be satisfied if NFM is to become operational. To complete the report we discuss potential applications of the recommendations for USAID assistance programs, focusing on three areas of emphasis, namely,

the public sector, the private sector, and rural communities. In each of these three areas, training appears a necessary condition for success.

While the debate on natural forest management continues, so too does the loss and degradation of large areas of unprotected natural forest cover in Latin America and the Caribbean. The Assessment Team believes that making natural forest management a viable form of land use will be a major step in offsetting the high rates deforestation while contributing to rural income and employment generation in the region. We hope that this assessment and the recommendations it offers can assist USAID in structuring its future role as a leader in the debate on natural forest management and socioeconomic development, and in defining future courses of action in this important field.

1. Introduction and Overview

USAID’s natural forest management (NFM) initiatives in Latin America and the Caribbean (LAC)—worth approximately \$145 million over the past 15 years—have sought to add value to forests while contributing to their long-term conservation. The purpose of this study is to assess the issues and opportunities, identify course corrections, consolidate gains, and decide generally how to proceed with NFM. This report addresses USAID’s NFM projects, as well as collateral initiatives that support this shared purpose.¹ This chapter presents the review’s context, purpose, scope, and methodology.²

1.1 Overview of USAID’s Involvement in Natural Forest Management in Latin America and the Caribbean

Latin America and the Caribbean, with more than half of the world’s tropical forest area (964 million hectares), has been a primary focus area for USAID’s efforts to tackle the global issue of forest management. Beginning in the mid-1980s, USAID missions and USAID headquarters in Washington have provided resources to help governments in the region to protect and manage forests, initiating projects focusing on NFM and timber use—BOSCOSA and FORESTA in Costa Rica, the Forestry Private Enterprise Initiative in Ecuador. USAID has since invested more than \$145 million in similar projects and programs in seven countries in the region, providing the basis for this review (Table 1).

¹ Building on a recent analysis of USAID’s Global Forestry Program (Byers 2001) this review studies USAID’s experiences in NFM and related activities in seven countries: Bolivia, Brazil, Costa Rica, Ecuador, Guatemala, Honduras, and Peru. This review focuses on the management of natural forests to produce timber and non-timber products and maintain environmental services. It does not consider USAID’s support for protected areas (parks and reserves), reforestation, plantation forestry (“human-made” forests), agricultural tree crops, or agroforestry systems.

² This assessment was prepared for the Environment Unit, Office of Regional Sustainable Development, Latin America and Caribbean Bureau, U.S. Agency for International Development (USAID/LAC/RSD/E).

Table 1. Countries and Programs Reviewed

Bolivia
<ul style="list-style-type: none">• BOLFOR (1994–2003), \$25 million
Brazil
<ul style="list-style-type: none">• Support for forest diagnostic studies; development of reduced impact logging technologies (1997–2001), \$2.21 million
Costa Rica
<ul style="list-style-type: none">• BOSCOA (1987–96), \$1.9 million• FORESTA (1989–96), \$14.5 million• REFORMA (1993–97), \$2.2 million
Ecuador
<ul style="list-style-type: none">• Forest Sector Development Project (1983–91), \$8.1 million• Forestry Private Enterprise Initiative (USAID/W-financed 1986–90), \$3.5 million• SUBIR (1991–present), \$19.5 million
Guatemala
<ul style="list-style-type: none">• MAYAFOR (1990–present), \$10.5 million• Wood Utilization and Marketing (RENARM) (1990–92), \$1.5 million
Honduras
<ul style="list-style-type: none">• Forestry Development Project (1988–94), \$31.4 million
Peru
<ul style="list-style-type: none">• Central Selva Resource Management (1983–90), \$25 million• BIOFOR (1998–present) \$4.2 million
TOTAL \$145.3 Million

Regional NFM Initiatives

In addition to country-specific projects, USAID’s Washington-based Global Bureau and Latin America and Caribbean Bureau have supported regional activities that have added to the agency’s natural forest management efforts. These additional programs can be grouped in three categories: Investment and Business Analysis, Forest Management, and Policy Analysis and Dialogue.

Investment and Business Analysis

- Economic benefits of reduced impact logging compared to conventional logging (Holmes et al. 2000).
- Economic benefits of certification in Bolivia (Hanrahan et al. 1997).
- Regional conferences on private sector investment (WRI 1995).
- Constraints and development of an action plan to link Central American certified forestry producers to international certified forest product markets (Gretzinger et al. 1999).

- Assessment of lesser-known timber species potential in Central America (Forster et al. 2001).
- Assessment of Ecuador's Forestry Private Enterprise Initiative (Molinos 1992).

Forest Management

- Development and dissemination of management guidelines for the sustainable harvest of non-timber forest products (Shanely et al. 2002).
- Development and dissemination of guidelines for the design, maintenance, and construction of low-volume roads, such as logging roads (Keller, Bauer, and Aldana 1995).
- Training video with a forestry focus, "Environmental Analysis: A Decision-Making Process" prepared in English, Spanish, and Portuguese (Clark and Black 1995).
- Comprehensive annotated bibliography on tropical natural forest management (Putz and Pinard 1993).

Policy Analysis and Dialogue

- Case studies on the effects of timber trade and pricing policies on forest management (Stewart, Claire, and Gibson 1994; Stewart, Southgate, and Kernan 1993).
- Multi-donor conference on effects of macroeconomic and other policies on forest management (Stewart and Gibson 1994).
- The Green Book Policy Matrix prepared for the Central America Regional Office (Johnston and Lorraine 1994).
- Annual US Forest Service Caribbean forestry conferences co-financed by USAID (USDA Forest Service International Institute of Tropical Forestry 1994, 1999).

1.2 Development and Forests

Covering almost one billion hectares, forests are a principal natural resource and major land cover type in the region. In hectares per year, LAC has the highest deforestation rates of the developing world, though with substantial variation among subregions (Table 2). Forest degradation is of additional concern. As the IDB's environmental specialist in Brazil points out: "Statistics on forest degradation hardly exist, but the trends are similar to those of deforestation" (Dourojeanni 1999).³

³ The FAO's *Forest Resources Assessment* defines "deforestation" as a change in forest cover with a depletion of tree crown cover to less than 10 percent. "Changes from closed to open forest, which negatively affect the stand or site and ... lower the production capacity, are termed forest degradation."

Table 2. Changes in Forest Cover in the LAC Region

Region	Area of Natural Forest in 2000 (thousands of hectares)	Area of Total Forest in 2000* (thousands of hectares)	Annual Change in Total Forest, 1990–2000 (thousands of hectares per year)	Annual Change in Total Forest, 1990–2000 (percent per year)
Central America and México	72,300	73,029	-971	-1.2
Caribbean	5,145	5,711	13	0.2
Tropical South America	827,252	834,142	-3,456	-0.4
Temperate South America	47,911	51,476	-255	-0.5
Regional Total	952,608	964,358	-4,669	-0.5

Source: FAO, *Forest Resources Assessment 2000*.

* Includes forest plantations

Against this backdrop, what does natural forest management mean? *Natural forest* is difficult to define, and professionals debate this issue fervently. **As defined by the assessment team, natural forests are self-sustaining natural ecosystems that provide both ecological and economic values to society.** Most natural forests are originated and maintained by ecological processes of seed fall, dispersal, and resprouting. *Management* refers to deliberate human actions to conserve and use the forest for intended purposes. These purposes can be single or, more typically, multiple (giving rise to the term “multiple-use forests”). The products and services obtained from a natural forest depend on its biophysical characteristics, the user’s objectives, the available technologies and markets, the constraints and incentives set by laws and policies, and intangible factors, such as traditions and conservation ethics.

Most natural forests are on lands that are not wanted for agriculture and settlement—at least until the land frontier shifts outward as a result of population growth or technology (Kishor and Constantino 1993). This is not to say that these lands are useless. On the contrary, natural forests constitute a key part of socioeconomic and environmental development and provide many market and non-market environmental goods and services (Laarman and Sedjo 1992).

For USAID’s development agenda—supporting economic growth, global health, democracy and governance, and the environment—NFM offers a number of appealing features (Sartorius and Henle 1968; Westoby 1978; OTA 1992):

- Many forests are found in remote and economically poor areas, where human populations are often among the “poorest of the poor” and typically include ethnic minorities.
- The goods and services of the forest are essential for human welfare, and their role in meeting basic needs cannot be disputed—water catchment, construction materials, food products, and aesthetic and spiritual satisfaction. Many of these goods and services have multiple uses and benefits: upstream water is used toward many ends, including downstream agriculture, hydropower, municipal water systems, and beverage industries; logs are made

into lumber and plywood, which in turn are used by construction industries and furniture factories.

- Forests can be managed with little capital, so even modest levels of aid can have positive impacts.
- Only some forest management skills are specialized. People can accomplish much of the labor needed to manage forests with little formal education.
- Forest ownership and use are attractive themes for programs in democracy, governance, and decentralization.
- Forest management—when done well—provides positive outcomes for off-site populations, including residents of the United States. The shared global importance of biodiversity conservation, the maintenance of wintering habitats for neotropical birds, and potential carbon offsets are three examples among many.

1.3 Assessment Methodology

A four-person team conducted a series of short in-country trips to interview private and public sector specialists, analyze project approaches, and visit one or more project sites in each country.⁴

In addition to the main report, the team prepared country-specific reports, each with a list of documents reviewed. These country reports are included as Appendices A–G.

USAID is the primary audience for this review, but the content should be of interest to a broad range of stakeholders in government, industry, and civil society. An earlier version of this report was circulated to selected invitees at a regional workshop of stakeholders in Santa Cruz, Bolivia (September 12–15, 2001). Comments from an estimated 80 workshop participants have been incorporated into this document.

1.4 USAID’s Policies on Natural Forest Management

Effective management of natural resources is an important factor contributing to “Economic Growth and Agriculture,” one of the four pillars that currently structure USAID’s actions. In effective natural resource management, slowing the rate of deforestation remains a high strategic priority for USAID. However, the Assessment Team noted considerable ambivalence about forestry in general, and NFM in particular, within USAID’s missions in the LAC region.

USAID programs in NFM are shaped by policies of the U.S. Congress, and part of this ambivalence may be the result of misconceptions about Section 118 of Part I of the Foreign

⁴ The schedule of visits included Guatemala and Honduras (October 10–19, 2000), Peru and Ecuador (November 29–December 12, 2000), and Brazil and Bolivia (January 21–February 3, 2001). A desk study was conducted for Costa Rica.

Assistance Act (FAA) of 1961, amended in 1998 and 1999. Section 118 specifically prohibits the use of USAID funding for the “procurement or use of logging equipment ... unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner which minimizes forest destruction.”

Additionally, unless an environmental assessment indicates that the proposed activity will improve the livelihood of rural poor and be conducted in an environmentally sound manner that supports sustainable development, Section 118 denies assistance for the following activities:

- Converting forest areas to lands for rearing livestock.
- Constructing, upgrading, or maintaining roads (including temporary haul roads for logging or other extractive industries) that pass through relatively undegraded forest lands.
- Colonizing forest lands.
- Constructing dams or other water control structures that flood undegraded forest lands.

However, while these regulations are often noted for their evident prohibitions, Section 118 also places a high priority on conservation and sustainable development and encourages actions that strongly favor NFM, such as:

- Dialogues with recipient countries that stress the importance of conserving and sustainably managing forest resources.
- Projects and activities that offer employment and income to those who otherwise would cause destruction of forests.
- Training and educational efforts that increase the capacity to formulate forest policies and improve the management of forests.
- Projects to conserve forested watersheds.
- Training and research leading to sustainable and more environmentally sound practices for timber harvesting, removal, and processing.
- Conservation of biological diversity in forest areas.
- Requiring programs that significantly affect tropical forests to conduct careful analysis of the alternatives available to achieve the best sustainable use of the land and take full account of the environmental impact of the proposed activities.

Essentially, although much of Section 118 affirms forest management as a development option, language restricting USAID’s funding for logging in tropical forests seems to have convinced many agency personnel that it is extremely limiting.

In addition, USAID’s country development strategies must define actions necessary to conserve and sustainably manage tropical forests and address the extent to which the proposed programs meet needs and opportunities presented by managing tropical forests. This focus on the

importance of tropical forests was further reinforced with the issuance of the law on Debt Reduction for Developing Countries with Tropical Forests, also known as the Tropical Forest Conservation Act of 1998.

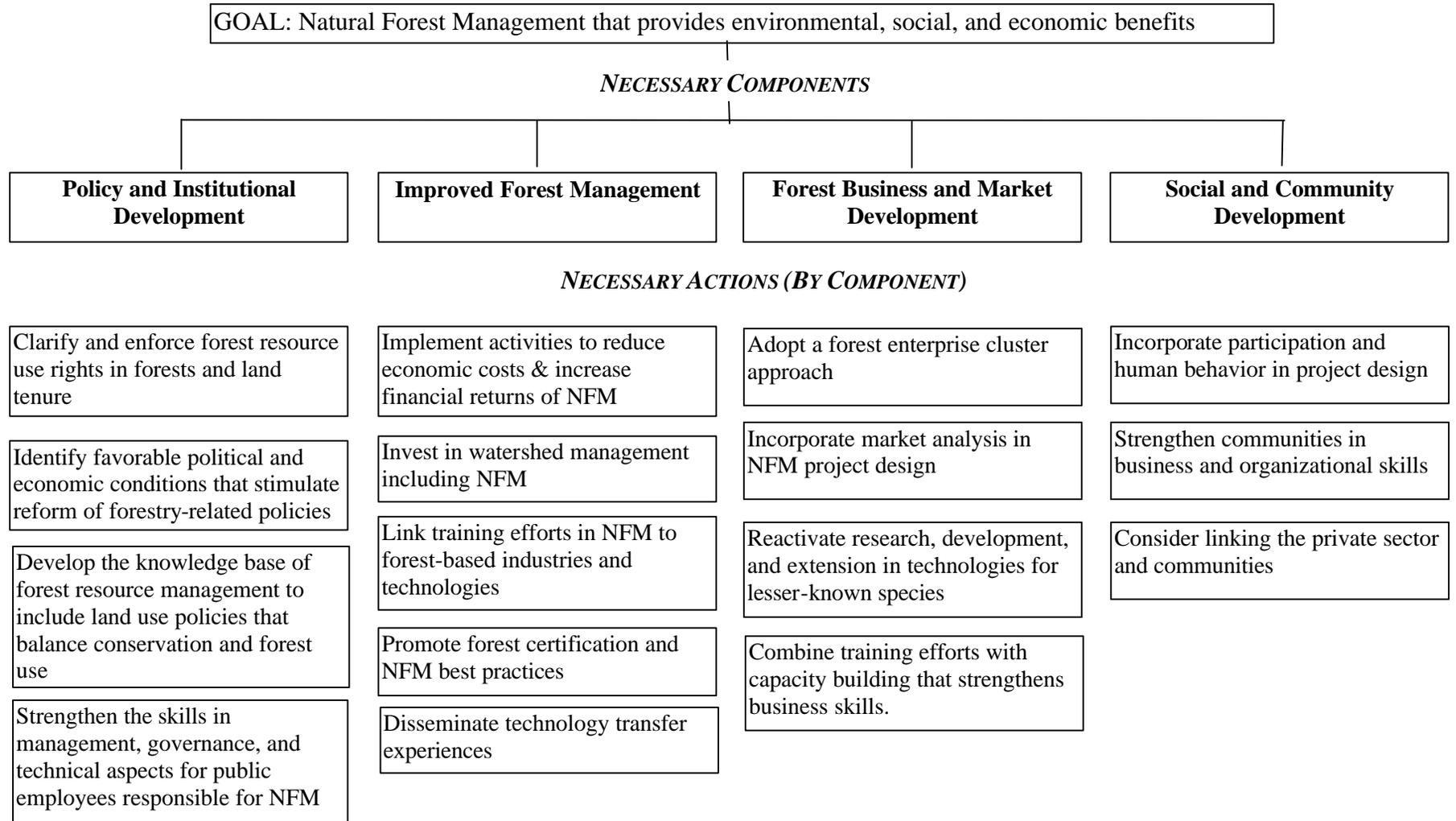
In short, USAID operates in a political and social setting of considerable controversy about forests and what to do with them, as reflected in the following examples:

- In Honduras, the mission withdrew its support for natural forest management under the Forestry Development Project (FDP). The mission said the auction system to transfer public timber—a significant achievement of FDP—“has been hindered by collusion within the sawmill industry, which resulted in the presentation of only one offer per sale” (Alvarez 2000). COHDEFOR, the national forestry agency, seemed unable or unwilling to correct the problem. Observers also questioned whether the country’s forest management plans were really being followed.
- In the Andean region, despite substantial opportunities, there seems to be little appreciation for NFM as a potential alternative to drug cultivation. Currently alternative development programs focus on encouraging permanent cropping systems, such as coffee and fruit trees. Much of Peru’s tropical lowland area, where coca eradication programs are taking place, is well suited for NFM—but, to work, that idea will need stronger advocates.
- In Guatemala, during the design of the MAYAFOR forestry component of the Maya Biosphere Reserve Project, proponents and opponents exchanged a series of polemic letters on whether USAID should support NFM in the Petén. Opponents equated forest management with deforestation, the loss of biological diversity, mistreatment of indigenous communities, and a long history of ill-conceived exploitation of natural resources. Despite tentative indications that forest concessions in Guatemala are faring as well as or better than the parks and reserves, condemnation of forestry as a land use continues to resonate.⁵

The LAC Bureau—and perhaps USAID-wide senior staff—needs to transmit these clarifications to the missions. In addition, it could seek opportunities to inform its senior decision-makers about NFM as a development option. Increased understanding of NFM would greatly benefit program and project managers at all levels. In an attempt to address this need, this assessment offers insights and suggestions for future program activities. Figure 1 presents a results framework that highlights recommendations and actions. The assessment team recognizes that, in many cases, these themes are linked. They are separated here for ease of presentation, interpretation, and response.

⁵ Based on field inspections by the assessment team, it appears that more illegal activities and forest degradation are taking place in parks and reserves than in community-based forest concessions.

Figure 1. Recommended Actions in Design and Implementation of NFM Activities



2. Issues and Opportunities

This assessment is not an evaluation of specific USAID programs. The findings are broad in scope and address recurrent themes that are meaningful for program success. Two broad categories of findings present issues that need resolution and successes worth replicating.

Our observations are organized into four categories:

1. Policy and institutional development
2. Forest management
3. Business and market development
4. Social and community development

Each issue or opportunity for USAID is presented as follows: a brief introductory finding, case materials (examples, references, or supporting evidence), and a conclusion related to the case. Recommended courses of action are presented at the end of each of the four major sections of this chapter.

2.1 Policies and Institutional Development

2.1.1 Planning and Policies for Multiple-Use Forests—Where Neither Parks Nor Plantations Are the Answer to Sustainable Resource Use

Finding: Over the last decade, nearly all countries in the region increased the number and area of national parks and reserves. Many also established significant areas of forest plantations. However, vast areas of natural forest in LAC are still neither protected nor managed. Parks meet one objective, plantations meet another—but efforts to address what to do with the extensive (non-plantation) natural forests that lie outside protected areas have been only marginally successful.

As the case materials describe, Brazil, Costa Rica, and Guatemala have undertaken ambitious projects to establish and manage parks and protected areas. Bolivia and Brazil have also undertaken important plantation and reforestation initiatives. However, parallel or equivalent efforts in natural forest management are lacking.

Case Materials: Brazil's National Forest Program has classified 28 percent of the Amazon region as indigenous reserves and national parks. In 1999 a commitment was made to designate an additional 10 percent as national forest and, in theory, to open that area to sustainable multi-purpose use. This is an impressive commitment, but implementation is slow, with only 1.6 percent of the Amazon designated as multiple-use national forest as of 2000 (Schneider et al. 2000). Moreover, full implementation of these ambitious commitments would still leave 62

percent of Amazonian forests open to less controlled logging, agriculture, urbanization, damming, and mining.

In 1992 Guatemala established the Maya Biosphere Reserve to conserve the largest remaining tropical lowland forest in Central America and protect its world-famous Mayan archeological sites. Initial efforts by CONAP, the Guatemalan Protected Areas Agency, to restrict timber harvesting in the Biosphere Reserve were violently resisted by logging interests and local communities. In recent years CONAP offices have been burned, and a CONAP official was murdered in retaliation for the restrictions. With the support of USAID through the MAYAFOR project, CONAP designed and implemented a program of community forest concessions in the multiple-use area of the reserve. This appears to have lessened tensions by providing at least some local income.

In Costa Rica about 21 percent of the country is dedicated for national parks or other protected areas. Nevertheless, deforestation and uncontrolled development outside these areas tend to isolate them as green islands in a sea of degraded lands. In 1995, Costa Rica responded to this by establishing a National System of Conservation Areas (SINAC) that divides the country into several conservation area units (UACs) organized around national parks. Management of each UAC is delegated to a local autonomous decision-making body. Although local people are encouraged to participate, SINAC has had difficulty integrating them into protected area management. Effective community participation will require that SINAC implement policies and initiatives that empower local people to participate in the management decisions that have a direct impact on their well being.

Forest plantations represent another type of land use. A few countries of the LAC region are among the global leaders in this form of forestry. While the plantation area in Latin America and the Caribbean is no greater than 1 percent of total forest cover, plantations supply an increasing share of raw materials to forest industries (see Table 2; IADB 1995).⁶ These industries have applied considerable pressure on national authorities to obtain subsidies for plantations, which often compete with NFM practices. For example, in Brazil the AIMEX Technology Diffusion Center and Forest Seed and Seedling Laboratory has created publicity materials asserting that plantations offer an alternative to NFM. And in Bolivia, the *Cámara Forestal* supports the establishment of reforestation incentives to offset deforestation. Forest plantations and NFM are not mutually exclusive. Both are legitimate land use options that should be supported by forest sector policy.

Conclusion: The very different examples of Brazil, Costa Rica, and Guatemala share a common conclusion: at a policy level, each country has to address what to do with natural (non-plantation) forests that lie outside of protected areas. Currently, large areas of natural forest in LAC are not covered by an effective policy regime—and are therefore vulnerable to degradation and

⁶ According to FAO projections, wood from natural forests should continue to provide a major share of industrial wood and fiber raw materials for the next 50 years. However, plantations are expected to provide an increasing share of total industrial requirements and may even contribute a larger share than natural forests by the end of this period. The perspective of policymakers, particularly in the developing world, on the fundamental factors of accessible markets, clear property rights, and consistent overall policy environments will be the key to an increasing contribution of forest plantations to reducing the pressure on natural forests (Sève 2001).

conversion. Nearly every country has one or more government units charged with land-use planning and policy. The challenge is to encourage these technical bodies and the political authorities to understand that forests can be a “best” land use—going against centuries of conventional wisdom in LAC. How many members of such a body could successfully explain and illustrate multiple-use forest management? How many could convincingly argue that parks and plantations are not the only answer to sustainable land use? How many land-planning units have the technical field support they need for forest inventories and mapping? How many countries have good policies for forest conservation and management on lands that are not in reserve status? For each question the answer is the same: not many.

2.1.2 Resolving Conflicts over Use Rights and Tenure

Finding: Conflicts about land tenure and use rights in forests exist in every LAC country. The insecurity of tenure allows the entry of illegal loggers and squatters and impedes long-term investment in protecting and managing the forest.

Case Materials: Bolivia’s BOLFOR project illustrates the complexities of land tenure and forest use rights, as well as progress on resolving these challenges. Before 1995 the Bolivian government had awarded timber-cutting contracts to companies and speculators on 22 million hectares of natural forest—lands previously claimed by indigenous groups and private individuals. In the late 1990s the Sánchez de Losada Administration enacted laws to decentralize many government functions to the municipalities and indigenous groups, creating a significant opportunity to resolve forest tenure issues. The enactment of Forest Law No. 1700, with USAID’s support through BOLFOR, established a system of forest concessions with a user fee of \$1 per hectare per year, regardless of timber values or location. For large actors who had earlier been granted speculative use rights on hundreds of thousands of forested hectares, the charge is significant. Rather than pay the annual fee, these actors returned about 15 million hectares to the government. As a result, the government of Bolivia was able to recognize nearly 8 million hectares as indigenous lands, and to distribute an additional 3 million hectares to local communities organized by municipal governments (Taylor, Nittler, and Kraljevic 2000). These distributions have reduced tenure conflicts, though some indigenous land claims have yet to be resolved.

Timber theft and invading squatters are typical problems where property boundaries may exist and tenure may be clear but neither is enforced. Brazil’s 1998 constitution recognizes the rights of indigenous people over their traditionally occupied lands and natural resources. And by law, Brazil restricts the sale of these lands and their timber rights to prevent the communities from being cheated in transactions with loggers and settlers. Nevertheless, because of poor enforcement of the law, communities continue to be defrauded by corrupt practices and irresponsible logging.

In Peru, the Central Selva Resource Management Project originated with opposition to USAID’s financing of a road crossing the lands of the Yanéscha people. International concern about the road grew as human rights issues emerged on whether the Yanéscha could resist development pressures from colonists. USAID redesigned the project to include land titling, sustainable timber cutting and processing, and management of a protected area. Despite guerrilla activities that interrupted forest harvesting and wood processing, land titling was eventually completed for

most Yanasha communities. Subsequently, the Yanasha Forestry Cooperative was formed, putting the local community directly in charge of the sustainable management of the newly titled forest land and providing the Yanasha with the legal framework to protect their land and resources. The Yanasha Communal Reserve was also established, and it now serves as a hunting reserve and a buffer zone for the steep slopes bordering the Yanachaga-Chemillén National Park.

Conclusion: Progressive governments in the region recognize that local communities are entitled to retain their traditional rights of forest use. Legal and programmatic efforts are underway to improve titling and strengthen community and indigenous claims. In the meantime, where land rights are unclear, forests are vulnerable to illegal cutting and occupancy, and NFM has little chance to succeed. While conflicts over land rights seem to be never-ending in LAC, USAID’s contribution to the new forest law in Bolivia illustrates that creative and far-reaching approaches are possible. USAID’s help for the land rights of the Yanasha in the forests of Peru is another significant accomplishment. The clarification of forest use rights helps nearly everyone—except illegal loggers. Traditional users enjoy more security, legitimate enterprises of all types have greater confidence to invest in NFM, and government agencies receive less criticism.

2.1.3 Roads: What Rules Are Realistic?

Finding: A policy of “no roads” is incompatible with NFM, since roads are critical for both timber extraction and market access. An alternative to “no roads” is “smart roads”—well-designed routes that are protected from unwanted colonization.

Case Materials: In Peru, a road was built through the upper reaches of the Palcazú watershed with USAID support. In the absence of government intervention, several small—and apparently illegal—logging operations cut logs on the steep slopes of the upper watershed. The logs were then dropped to the access road or walked down existing drainage ways. This activity caused rampant erosion on the slopes, undermining the zoning achievements of the Central Selva Project and contributing to the deterioration of the already poorly drained road surface (USAID/Peru 1989; Southgate and Elgegren 1995).

In Brazil soybean producers are lobbying for a road to be built from Campo Grande to Santarém. Although civil servants are working to provide adequate information on the long-term costs of controlling road-related colonization and forest degradation, the outcome is not yet clear (Linden 2000). A well-informed debate will require an in-depth understanding of what happens when there is no process to prevent or guide post-road colonization. It also will require a look at the bigger picture of the economics of soybean farming that considers the full social and ecological costs of transport systems as well as a full natural resource accounting (Nepstad et al. 2002).

Conclusion: Opening roads into or across forested areas poses risks that the forests will be entered in uncontrolled ways. However, given the important economic and social issues at stake, declaring an end to road building in forested areas is not a viable option. A more practical approach would be to plan and design roads in such a way that environmental consequences are minimized and road-driven colonization is controllable. In Sub-Saharan Africa USAID developed a successful environmental assessment methodology for road building, which found that remote sensing and geographic information systems were very useful tools for road siting and defining protection needs along routes. In the LAC region, USAID and the USDA Forest

Service have developed and disseminated guidelines for low-volume roads, using examples from Central America. The methodological and substantive results of both experiences need to be more widely applied.

2.1.4 Implementation Capacity in the Public Sector—The Search for New Approaches

Finding: In too many cases, public agencies have neither the capacity nor the necessary resources to carry out the functions assigned to them for forest protection and management.

Case Materials: The new Peruvian forestry code of July 2000 requires timber concessionaires to submit forest management plans. However, the National Institute of Natural Resources (INRENA) does not have adequate capacity—either in qualified personnel or in funds for field inspection—to review and approve these plans. Not surprisingly, this situation encourages evasion and continuation of illegal activities.

INRENA is charged with implementing other questionable policies and guidelines as well. For instance, the government prohibits the use of chainsaws to square timbers on the grounds that it wastes a great deal of wood. But since the small wood-cutter has no other market or technology, this regulation is unrealistic and tends to drive forest cutting activities underground, making illegal extraction the only choice for meeting the demand for forest products. So, in essence, the public agency is charged with enforcing an unenforceable regulation.

In Brazil the Brazilian Environmental Institute (IBAMA) is responsible for setting environmental standards for the management of natural resources. Administrative requirements can be bureaucratic, and public agency processing is seldom timely. Both IBAMA staff and the forest industries acknowledge that this agency has neither the staff nor the operational resources to enforce forest regulations. In recognition of this reality, the Brazilian government has begun to delegate forest regulatory responsibilities to the states, with the stipulation that state regulations cannot be less restrictive than national laws. With this approach, there is the potential for local concern for forest and land use to be better represented. However, state capacity for policy making and enforcement remains a question.

In Bolivia a *pausa ecológica*, or ban on logging (1990), was the government's attempt to resolve indigenous and community forest rights and reduce illegal logging. While this measure failed to achieve its ambitious goals, it did turn national attention to forest problems, and it convinced the forest industries to acquiesce and accept a new forest law. Law No.1700 created the semi-autonomous *Superintendencia Forestal* to oversee regulations and collect forest fees and other revenues. Recently, this agency may have lost political support with the change in government. It is also understaffed and poorly equipped, but it does have a reputation for professionalism and honesty.

Conclusion: Despite decades of bilateral and multilateral aid to LAC public forestry agencies, many of them continue to be weak. Both Bolivia and Brazil are graduating toward new organizational structures—though they are pursuing very different strategies. USAID, with its decades of experience in institution building, has the opportunity to help national governments redesign their public institutions for forests, among other natural resources. In particular, “command-and-control” approaches should be replaced with alternatives that are field tested

before implementation. In some countries and sectors, USAID has helped establish national advisory councils of stakeholders for policy and planning. These councils are among the new models that offer promise for USAID support.

2.1.5 Recommendations for Policy and Institutional Development

- **Identify and take advantage of windows of opportunity** that present favorable conditions for changes to environmental policy, regulations, and institutions. These opportunities include situations in which governments demonstrate the political will to change, either because they have been recently elected and show interest in forestry and natural resource management issues, or because catalytic events (such as rapid deforestation or social conflicts) stimulate reform of forestry-related policies and practices. Newly enacted forestry legislation in Bolivia and the delegation of regulatory responsibilities to states in Brazil are examples of where USAID-funded NFM programs have taken advantage of favorable situations.
- **Encourage policy makers to foster improvements in the knowledge base** about forest resources outside protected areas and develop land-use policies that balance their conservation and use. Forests outside of protected areas are the site of most deforestation in the LAC region. At the same time, many of these forests offer ample opportunities for sustainable utilization, if appropriate policies and land-use plans are applied. Increased use of geographic information systems should be a major tool for improving the knowledge base and in land use planning.
- **Encourage governments to clarify the rights and obligations** of central government institutions, local governments, communities, and individuals for natural forest ownership and resource use. Tenure rights are essential for the sustainability of NFM—insecurity of tenure is a major factor in forest degradation—and the structure of these rights is far from clear in many LAC countries. Likewise, there are ample opportunities to continue assistance in **conflict resolution** over user rights and tenure in natural forests, such as mediating conflicts between indigenous communities asserting their ancestral claims and customary rights versus the statutory rights exercised by private enterprises holding concessions. Continuing assistance on these matters can build on significant past successes, such as those in Bolivia and Peru.
- **Strengthen the skills in general management, governance, and technical fields.** Continued training for employees of public institutions at national, municipal/provincial, and local levels responsible for natural forests offers a major opportunity to sustain impact. An overall impression that emerged from this assessment is the weakness of many of the institutions governing natural forests in LAC. Consequently, a key to success is a better-trained professional civil service with enhanced credibility, professionalism, and technical competency. Training would also improve the ability of these institutions to serve their constituencies and would garner sufficient support to ensure continuity of NFM policies and practices independent of changes in government.

2.2 Forest Management

2.2.1 Financial and Economic Returns

Finding: For NFM to be economically attractive to investors, costs must decrease and returns must increase.

Case Materials: Logging that relies on outdated and poorly maintained equipment raises costs. Yet improved technology is only part of a solution for better forest management in the presence of illegal logging. The widespread availability of cheap logs is a significant impediment to profitable NFM. In Brazil, about 86 percent of the harvested timber comes from sources without approved management plans (Zweede 2001). It is easy to understand that spending on NFM cannot have a financial payoff where there are rampant illegal supplies.

Costa Rica provides the most imaginative examples of how to increase payments for owners of natural forests. In large measure through USAID's creation of the FORESTA project in the Central Volcanic Region, Costa Rica is testing several pilot schemes to pay for environmental services (defined in a 1996 forestry law as carbon fixation, hydrological services, biodiversity protection, and provision of scenic beauty). Since 1997 Costa Rica has allocated \$14 million to forest owners—at an average of \$147 per hectare—for forest protection, management, and reforestation. The owners, who hold an average of 80–100 hectares, receive the payments over five years in exchange for their land's environmental services to the government during that period and for protecting and managing their forests for 20 years. If a property is sold, the obligation transfers to the buyer. The government of Costa Rica, in turn, acts as intermediary and sells the forest-based services to domestic and international buyers. Funds to pay the participating forest owners are raised from the proceeds of these sales and a tax on domestic fuel (Chomitz 1999).

Also in Costa Rica a private electricity company with two hydroelectric facilities offers landowners in its watersheds \$10 per hectare per year to maintain or restore forest cover.⁷ Field NGOs supported by USAID and others have helped administer these incentives. Additionally, Costa Rica has created certified tradable offsets (CTOs) to raise capital in the market for carbon sequestration and has done very well in promoting employment and income from ecotourism (Chomitz 1999; Lindberg 1991).

Non-timber forest products also help increase returns to NFM. In Guatemala's Petén, for example, USAID has supported the marketing of allspice, *xate* (a fern for flower arrangements), *chicle*, and ecotourism. In Beni, Bolivia, the focus is on Brazil nuts. Some non-timber forest products generate important cash flows year-round or during agricultural off-seasons, and most place low demand on capital and facilities. Non-timber forest products also have an important social role as a vehicle for increasing rural participation. While early analyses exaggerated the financial significance of non-timber forest products (Peters et al. 1989; Southgate, Coles-Ritchie, and Salazar-Canelos 1996), they are undeniably important in some forests for some people.

⁷ As a point of reference, pasture rental fees are \$20–30 per hectare per year.

Conclusion: LAC presents instructive pilot examples of reducing the costs and increasing the returns of forest management. Factors prejudicial to the financial viability of NFM are the high cost of legal logging (in management, logging costs) and the presence of illegal logging. The addition of non-timber products and environmental services can increase financial viability. The portfolio of projects under review promotes reducing costs and increasing returns from natural forests. However, efforts to develop non-timber forest products have been modest to date and incomplete—a few countries, a few forests, a few pilot initiatives.

2.2.2 Forests in Watersheds

Finding: Though not yet in widespread use in upland areas, NFM is a logical programmatic component of watershed management, a preventive approach that sustains water supply, supports agriculture, and mitigates the impact of natural disasters, such as floods and landslides.

Case Materials: Maintaining natural forests on mountain slopes helps with critical watershed functions, such as supplying potable water and supporting hydropower and irrigation (IADB 1999). Additionally, large-scale disasters, such as Hurricane Mitch, and localized events, such as landslides, illustrate the human and economic losses that occur when nature’s furies are unleashed where the environment has been degraded.

There is some academic controversy about the links between forests, water flows, and slope stabilization (Hamilton, Gilmour, and Cassells 1997). At the same time, there is little disagreement that protecting and regenerating natural forest cover is a cost-effective way to maintain the upper reaches of a watershed. Rather than leave their degraded lands, many upland peasant farmers around Cuenca, Ecuador, and San Pedro Sula, Honduras, are planting perennials, such as fruit trees, which maintain soil cover. While these efforts are not NFM, encouraging farmers to allow natural succession to proceed could lead to forest regeneration. NFM could supplement agroforestry initiatives by serving to supply wood and protect against soil degradation.

Despite the importance of upper watersheds, for the most part USAID’s programs in natural resources have shifted out of the highlands in many of the countries reviewed here. It often takes a major disaster to reawaken interest in the connections between upstream and downstream. Following Hurricane Mitch in Central America, USAID initiated a project to monitor and respond to hydrographic conditions in the Río Lempa watershed (El Salvador, Guatemala, and Honduras). Likewise, USAID in Honduras and Nicaragua programmed funds to address the hurricane’s devastation. Using some funds to implement initiatives, such as pilot NFM projects in upland areas, could support disaster mitigation and prevention, augmenting the almost exclusive focus on post-disaster recovery.

Conclusion: The time may be right in many upland regions for land uses that offer alternatives to erosive open-furrow agriculture. Modified NFM allows for some extraction of products, under the right conditions, generating tangible resources for upland residents while, at the same time, stabilizing water yields for downstream consumption. In combination with perennial crops, NFM offers a low-cost option for managing the upper reaches of watersheds.

2.2.3 Reduced-Impact Logging

Finding: Careful tree harvesting or reduced-impact logging (RIL) is a key technique for natural forest management to succeed.

Case Materials: Some research suggests that success or failure in NFM is largely a matter of appropriate tree selection and logging (Wadsworth 1997). Key aspects of this are the number and spatial distribution of trees cut, the mix of species, the collateral damage to other vegetation, the amount of soil compaction, and the effects of all of these factors on forest regeneration and regrowth.

The Tropical Forest Foundation (TFF) in Brazil and BOLFOR in Bolivia are two USAID projects exploring post-harvest silviculture to improve tree crops in future cutting cycles. In Brazil USAID has supported the TFF in conducting experiments in RIL in mixed Amazonian forests. The TFF project is among the most sophisticated and successful of its kind (Holmes et al. 2000). Increasingly, timber-based enterprises believe that RIL can improve their cost competitiveness, and some companies are asking TFF to train their personnel to implement RIL techniques in their forest operations (TFF 2000).

Despite notable advances, several factors still impede the adoption of RIL. These include the perception (often correct) that RIL requires a larger initial investment than conventional practices, the failure of traditional logging to account for direct and indirect costs of wasted wood and damaged forests, and the lack of workers trained in RIL. Other factors include the cost of purchasing improved logging equipment; logging economics that favor maximum volume removals in the short-term, rather than long-term efficiency; and the fact that governments are unable or unwilling to penalize conventional loggers for forest damages (Putz and Dykstra 2000).

Conclusion: RIL is an attractive and essential technology for NFM. USAID deserves credit for good experimental work with this technique. The next challenge is to overcome barriers that inhibit adoption of RIL on a wide commercial scale. By now the testing of RIL is adequate. USAID should consider how it could capitalize on the lessons that have been learned and expand the scale of its use.

2.2.4 Certification of Good Forest Management

Finding: The proposition that the management of forests should satisfy certain environmental and social standards and be certified as such by independent auditors has found considerable acceptance in LAC—in part due to solid backing by USAID. There is much more to do, though, to move beyond the pioneer stage of certification in LAC.

Case Materials: In part because of the political and technical support of BOLFOR, Bolivia now has 1 million hectares of natural forest certified under “good” management—the same as Brazil (Table 3). To enable Bolivia to develop its own national capacity in forest certification, BOLFOR helped create the Bolivian Council for Voluntary Forest Certification (CBCFV 2000). Through BOLFOR, USAID was able to take advantage of several motivating factors: Bolivia’s concentration in exporting mahogany, a species closely watched by the international

conservation organizations; the increasing shortage of mahogany and the need to market other species; the national policy requiring new technical standards as a condition for retaining forest concessions; and Bolivia’s assumption that certification may be one way to help offset market disadvantages, such as high transportation costs. It is noteworthy that Bolivian exporters do not obtain higher prices for certified wood than for uncertified wood, at least at present. Certification can favor market access for products but will not guarantee higher prices in today’s highly competitive world market for wood products.

Table 3. Certified Forests in Latin America and the Caribbean, including Plantations

Country	Number of Forest Units	Hectares (thousands)
Argentina	3	22
Belize	1	96
Bolivia	8	1,000
Brazil	19	1,056
Chile	3	183
Colombia	1	20
Costa Rica	17	80
Guatemala	10	306
Honduras	2	14
Mexico	20	503
Panama	3	8
Uruguay	3	62
Total Region	90	3,281

Source: FSC 2002.

In Guatemala, USAID worked with CONAP and several conservation NGOs to achieve group certification of natural forests in four community concessions. The premise of group certification is to spread the fixed costs of the assessments over more hectares to allow the involvement of small and medium holdings. Currently, the community forest concessions are the largest block of natural forests under certifiably “good” management in Guatemala.

However, much of Guatemala’s certified wood has not found the right buyers and continues to be sold to traditional outlets that are indifferent to certification. So far, local wood buyers who do not care about certification interact with the Petén communities better than international buyers who might favor certified products. Community leaders are still not fully convinced that certification really is an advantage; it costs money to achieve and has not yet brought higher prices or market advantage. Moreover, to apply forest management, the communities must rely on technicians who have to be paid from external sources until cash flow builds up, continuing the communities’ need to seek financial subsidy. In short, it is too early to declare success. In community forest certification in Petén, USAID and its partners are still learning.

Understanding that more guidance about forest certification will be required before governments and industries accept it, USAID's regional environmental program in Central America, PROARCA, invested in three years (1998–2001) of short courses, policy sessions, and certification demonstrations. During this period, PROARCA engaged more than 200 industry and public decision-makers from all seven countries in “show and tell” about forest certification, using Central American examples. As a result, several communities and firms have taken the initial steps toward certification. Additionally, PROARCA chose 20 forest management units more or less equally distributed among the seven countries for pre-certification exercises. The purpose was to help the owners and managers recognize how close or far they are from meeting the standards for certification and how much it would cost (in money and time) to achieve certification.

To broker information exchange, in USAID convened a forum in Guatemala City to bring together buyers, producers, and sellers of certified forest products. The focus was principally, but not exclusively, on Central America and followed a similar event in Bolivia sponsored through BOLFOR. The Central American event featured exhibitions of products and booths, as well as a special session for buyers and producers to meet each other. The result was increased contact between domestic and international buyers and Central American producers, which has led to more active markets for local wood products (Gretzinger et al. 1999).

Conclusion: USAID has been active in parts of LAC in promoting forest certification by engaging and educating decision makers about the purposes, methods, costs, and benefits of certification. At another level, USAID has attempted to foster market connections between producers and potential buyers of certified forest products. At a third level, USAID has helped set up organizational structures for forest certification—CFV in Bolivia, community-forest group certification in Guatemala. However, the assessment team considers this only a beginning, and believes that these nascent efforts will require strong follow-up if forest certification is truly to take root in LAC. Working with independent certification systems, USAID should support field-based approaches to reducing the cost of certification and simplifying procedures while maintaining rigorous NFM standards. No one instrument solves all NFM problems, but certification helps achieve environmental and socioeconomic goals, along with more operational and procedural objectives. Certification can offer a template for monitoring program performance in NFM; it can be a means to comply with the terms of USAID environmental regulations; and it can be a vehicle to explain and defend NFM to critics who otherwise see forestry and foresters in a bad light.

2.2.5 Technology Transfer—Sharing Approaches That Work

Finding: Various technical accomplishments have been made in information systems, management, and silviculture that could be transferred.

Case Materials: Almost all NFM projects considered in this review used new technologies for forest inventory and baselines. Some projects have drawn on a combination of satellite imagery with in-house geographic information systems for data collection, mapping, and analysis. Global positioning systems make it easier to locate critical boundaries, check the accuracy of maps and inventories (“ground-truth”), and link communities with their traditional territories.

SUBIR in Ecuador is using data from the IKONOS satellite as a tool for forest management at a fine scale on community lands. SUBIR has made pioneering efforts to develop technical prescriptions for plots ranging from community forests to woodlots on individual farms (Tolisano and Howard 1997; Zuleta and Villacres 1999). The project's understanding of the ecology and management of lowland tropical forests is exemplary, and SUBIR's management system (zoning, diameter limits, harvesting limits, and reduced-impact logging procedures) is one of the most advanced cases of community forest management in the region.

Small steps in management efficiency can go a long way toward productivity improvements. BOLFOR has begun experiments to test the biological impacts and financial costs of some silvicultural measures—vine elimination, liberation thinning, and induced natural regeneration—to improve post-logging quality and growth (Pariona and Frederickson 2000).

The most successful NFM projects use field-oriented staff and supervisors—individuals who are competent in forest ecology, technology, and management. In the course of this review, the team encountered a growing cadre of technically qualified personnel who enjoy forest management work, despite conditions that are sometimes difficult, and who are justifiably proud of their accomplishments.

Conclusion: USAID's portfolio of NFM projects for the LAC region offers several examples of applied know-how that could inform and guide other efforts, both inside and outside USAID. Disseminating information is a practical and legitimate role for USAID, especially on themes such as NFM. USAID's experience provides an opportunity for organizing a knowledge base and sharing it with partners and forest stakeholders.

2.2.6 Recommendations for Forest Management

- **Design pilot projects in NFM that facilitate the development of economies of scale** and increase the probability that projects can evolve to a larger commercial scale successfully. Assistance can be provided to partners in forming associations or cooperatives of disparate small operations which share common management needs. These could be organized into larger management units, pooling resources for functions necessary to all, such as marketing, harvesting, and fire control, among others. This type of integration would reduce overall costs and increase the efficiency of each small enterprise, as well as the overall management unit. This larger-scale perspective should be a major factor in the design of pilot projects and can give the project long-term vision and direction from the beginning.
- **Analyze potential incentives and disincentives to create options for stakeholders interested in long-term NFM.** Basic institutional reforms (such as strengthening tenure rights) and competency development (such as training for higher operational efficiency), as well as full value accounting for forest products and services will be major sources of incentives. Additional incentives to be considered include: marketing of the environmental potential of natural forests, such as ecotourism, credit plans for carbon sequestration, and non-timber forest products; and payment for non-market benefits offered by properly managed natural forests, such as soil conservation, water flow control, and biodiversity conservation. The Bolivian, Costa Rican, and Guatemalan experiences with these incentives are particularly significant.

- **Strongly support NFM in the design and implementation of watershed programs.** The LAC region contains vast areas of mountain forests, which are essential in maintaining stable water flows and play a major role in preventing natural disasters. Critical watershed areas must be identified, and the roles and responsibilities of public authorities, private owners, and communities in the effective management of these areas and in the funding of watershed protection efforts must be defined.
- **Stress links with forest-based industries and technology in NFM training efforts.** Emphasis should be placed on forest engineering, reduced-impact harvesting, wood processing, product development, and marketing. Training should include managerial, technical, and field personnel in communities, business enterprises, and government agencies. This would foster understanding of the necessary concepts, principles, techniques, and processes among participating professionals and stakeholders. USAID's successful experience in Brazil can be used as a basis for an expanded program.
- **Actively promote criteria and principles for certification of NFM best management practices.** To date, independent certification may have been the most important factor in increasing the area under natural forest management in the LAC region. While certification processes involve principles and criteria covering ecological, social, and economic aspects of forest management, controlling the environmental impacts of logging is an essential component of these processes. This is particularly the case in natural tropical forests, where much damage is caused by poorly designed logging operations—poor road and skid trail construction, over-cutting, and careless felling and skidding.
- **Manage NFM information more effectively.** Increased knowledge management would entail compilation of best practices and lessons learned in LAC forest issues. User-friendly formats should be used, including databases and electronic discussion lists. Target audiences should include forest administrators, private forestry enterprises, small landowners, and community leaders in forest areas. These audiences also should receive additional training in information technology and in using media resources.

2.3 Business and Market Development

2.3.1 Transformation of Forest-Based Industries—A Vision of What Should Happen

Finding: Forest-based industries need to shift from extractive operations with short planning horizons to industrial concerns investing for the long-term.

Case Materials: Forest-based enterprises in Bolivia, Ecuador, and Guatemala illustrate that the traditional way of doing business is increasingly untenable. This approach includes prospecting for high-value species—mahogany, Spanish cedar—with payment in advance and comfortable profit margins, despite the high cost of delays, uncertainties in obtaining harvest permits, and corruption related to transport permits. The planning horizon is only as long as the current logging season—often even shorter when a business faces a new government official or a logging ban. It is generally considered irrational to invest in roads and equipment beyond the

essential needs of the immediate season. Finally, because most enterprises are small or medium-sized and bookkeeping is often informal, they rarely understand their financial bottom line.

Private industries often compete with community groups for long-term rights to harvest and manage forests, subject to certifiable, good-stewardship performance. Because supplies of high-valued species are shrinking, this usually requires the harvest of a more diverse array of species, which, in turn, raises the challenge of creating new products, finding new markets, and addressing lower per-unit profit margins. Enterprises may need to update processing equipment to optimize the use of the more diverse raw materials coming from the forest, while also investing more in road building and efficient logging equipment. All of these adjustments add long-term, critical investment decisions to regular cost controls and production management. Accounting systems have to be kept up to date, especially since governments have increased pressure to collect business taxes

Progressive enterprises understand that new models such as reformed forest concessions and certification help remove uncertainties about legal status and the quantity and value of their forest resources. These models could vastly improve a perennial problem facing enterprises: obtaining bank credit. Increasingly, credit decisions rely on the ability of individual firms to present credible operating and financial statements. Moreover, the ability to raise investment capital from joint ventures and public offerings requires rigorous adherence to accepted accounting and business practices (Gretzinger et al. 1999).

Conclusion: Achieving a new generation of forest-based enterprises in LAC will require transformations in entrepreneurial outlook, business practice, technology, and investment decisions. Bolivia offers an example in which the forest sector is evolving to a more business-oriented outlook. Building on the success of BOLFOR, USAID/Bolivia is now funding the Amazonian Center for Sustainable Forest Enterprise (CADEFOR), whose mission is to enhance business management, product development, and marketing skills in forest-based industries.

2.3.2 Matching the Product, the Forest, and the User

Finding: A common mistake in forest-based enterprises is concentrating on a single species or product line without regard for what the forest can realistically produce or for how markets will respond to products.

Case Materials: USAID's Palcazú project in Peru originally expected that an isolated and inexperienced community enterprise would manufacture and sell preserved transmission poles to the national government. However, the project implementers soon realized that markets for construction lumber and agricultural stakes offered a much better fit with both the community's limited business and production capabilities and the raw materials the forest could produce.

A business problem typically emerges when too few species and too few timber grades are recovered. Remedies to the problem may involve relatively simple steps, such as improved grading of export lumber, a skill taught in mahogany-grading workshops in Guatemala. In Santo Domingo, Ecuador, better sawing and marketing could help recover quality pieces of timber for furniture and millwork from wood otherwise used for concrete forming (Molinos 1992).

Likewise, there is room for specialized firms to develop products from small trees, branches,

broken stems, and scraps. An entrepreneur in Guatemala has started buying leftover mahogany tops and branches from the community forest concessions in Petén to do just that.

Marketing strategies often overlook national and local markets. International markets typically buy high-grade and value-added products. Yet the in-country construction market is usually the best outlet for lower grades. Brazil exports less than 14 percent of the tropical timber it produces, and its southern and southeastern regions consume more than twice the amount of tropical timber imported by the 15 countries of the European Union (Smeraldi and Veríssimo 1999). For decades, the huge São Paulo market has provided an excellent outlet for lesser-used Amazonian species and lower grades not sought by European or U.S. buyers.

Conclusion: Without sufficient analysis, wood-processing technologies and product mixes can be poorly matched to what the forest provides. The opportunity lies in making intelligent choices about product lines, utilization technologies, and market outlets in relation to the characteristics of the forest. As for existing projects, USAID has opportunities to improve wood use and expand market outlets to increase financial returns, making the forest more valuable.

2.3.3 *Lesser-Known Species*

Finding: Low capacity to manufacture and market wood products from lesser-known timber species creates a significant problem. The number of technical personnel who understand the harvesting, processing, and marketing of lesser-known species is small—and may have shrunk over the past decade.

Case Materials: There are two main strategies for marketing lesser-known species, also called secondary species. The first strategy introduces lesser-known species into value-added products. Advances in wood-finishing materials and techniques now allow a variety of species to be finished as cherry, mahogany, and other preferred species. For example, since the early 1990s, the company Pórtico S.A. in Costa Rica has marketed high-end, finished doors made with *Carapa guianensis* (*caobilla*, *andiroba*, *tangare*) under the trade name “royal mahogany.”

The second strategy is to include lesser-known timber species as part of a composite product. For years, the plywood and blockboard industries have used lower grades and secondary species for inner plies and cores. In Petén, Guatemala, and Santa Cruz, Bolivia, leading manufacturers of doors and other millwork use edge-glued or finger-jointed pieces of lesser-known species for product interiors, saving mahogany and other preferred woods for exposed parts.

The expanded use of lesser-known species can increase harvests from natural forests (Toledo and Rincón 1996). Nevertheless, due to competing priorities, USAID and other donors have drastically reduced their support for projects and components that focus on technologies for using tropical woods. In LAC, this signal was amplified by the closure for training and applied research. Specialized equipment and tools were auctioned or lost, and personnel disbanded. After many years, investment in personnel and institution building was discontinued in Bolivia, Ecuador (Conocoto), Guatemala (ICAITI, INTECAP), Honduras (ESNACIFOR), and Nicaragua, to name a few.

Eschewing the use of lesser-known species can have a dramatic effect on the value and conditions of forests. In Petén, Guatemala, community forest concessions are harvesting about 4 m³ per hectare, less than a third of the forest's potential (conservatively estimated at 12 m³ per hectare in 30-year cutting cycles), while at the same time over-harvesting mahogany.

Conclusion: If enterprises do not have technologies to process lesser-known species, they continue to apply pressure to exploit—and over-exploit—a handful of well-known woods. USAID should reconsider its support for wood technology and marketing, with an emphasis on lesser-known species. The recommendations of a recent USAID-funded study may offer a way forward (Forster et al. 2001). Support could focus on rehabilitating the moribund facilities in several of the countries reviewed for this assessment.

2.3.4 Enterprise Clusters

Finding: Financial prospects for NFM are enhanced when clusters of enterprises conduct business with each other.

Case Materials: A cluster of forest-based enterprises could include a variety of specialized producers, each of which is efficient at using specific species, sizes, and grades of forest materials. These businesses, together, produce a diverse set of products and services. A mix of cooperation and competition among the different enterprises enables the cluster to increase value and decrease costs by pooling together for bulk purchasing, joint marketing, equipment maintenance, applied research, and political lobbying.

In Guatemala promising alliances have emerged in the Petén between traditional family firms and small community suppliers. However, these alliances will not survive without hands-on technical assistance in business and marketing for all participants. Honduras is also well positioned for clusters of forest-based enterprises, especially in its numerous pine-based industries.

In these two countries, the strengthening of forest-based clusters, currently in their initial stages, should focus on activating channels for business transactions, and dialogue to identify opportunities. In the particular case of communities and small enterprises involved in NFM, the development of clusters provides opportunities to deal effectively with timber buyers and the forest industry in getting the highest value for their products.

Conclusion: The concept of strengthening a “cluster” of related forest-based enterprises, rather than individual firms or individual products, fits well with current development thinking. This concept is particularly relevant for forests, where a principal challenge is generating sufficient value from extensive areas—often in frontier zones where businesses are few and small.

2.3.5 Adequate Scale

Finding: For heterogeneous mixed-species forests, NFM is most feasible when forest holdings are large or when small forested units can be consolidated under one management regime.

Case Materials: Table 4 illustrates the low-volume occurrence of timber species in lowland natural forests in Bolivia, Guatemala, and northwest Ecuador. Despite the crudeness of these data, they illustrate that the potential harvest per hectare is greatly reduced for the less common species.

Table 4. Timber Species Occurrence in Bolivia, Guatemala, and Ecuador by Volume (in cubic meters of mature trees per hectare)

	Choré, Bolivia	Guarayos, Bolivia	Sayaxché, Guatemala	Río Chanchich, Guatemala	Calle Manza, Esmeraldas, Ecuador
First species	13.7 ochoó	4.1 ochoó	3.5 santa maría	13.3 ramón	19.6 sande
Fifth species	0.9	1.0	1.0	3.1	1.1
Top five species	20.2	10.1	9.5	39.28	36.9
Top ten species	23.4	13.0	12.7	49.6	39.0

Sources: For Bolivia: Superintendencia Forestal de Bolivia 1999; for Guatemala: Forster 1997; for Ecuador: Palacios 1999.

Note: Volumes are subject to errors of tree identification, deliberate species exclusions by surveyors, and inventories based on commercial, regulatory, or tax considerations.

Conditions of end-product marketing, processing, and log handling are major factors in determining log volumes of a given species demanded by a particular raw material market. Conversely, in mixed-species forests, like most natural forests in LAC, a major factor of log supply of a given species is the concentration of the species in the forest. Based on calculations made by the assessment team, in current markets, most species with less than 2 m³ per hectare fall below the minimum concentration that is economically practical for extraction. With such low volume concentrations, large logging areas are required to assemble a log volume large enough to be marketable. Additionally, even larger areas may be required if species frequency is highly variable, as in Petén, Guatemala, and Santa Cruz, Bolivia. As a result, management units or concessions that allow for the sustainable harvest of a number of commercial species in volumes sufficient to be economically viable, require areas of several tens of thousands of hectares. These large-scale units can be established as either as one single large concession, or as an assemblage of smaller operations managed jointly.

Plan Piloto Forestal in southeastern Mexico, initially supported with aid from Germany, is a good illustration of a situation in which a large forest area (400,000 hectares) was managed by and for the benefit of peasant and indigenous communities (Dickinson et al. 1991). The community concessions in Petén, Guatemala (more than 130,000 hectares), provide another version of potential aggregation.

Conclusion: A central constraint for enterprises that use wood from mixed-species forests is obtaining a minimum critical supply of the needed species, which is then further refined by sizes and grades. Forest-based enterprises in the countries in this assessment need to draw on large forested areas to get a sufficient amount of raw material. In Mexico and Guatemala USAID has a

few examples of NFM that combine adequate scale with indigenous orientation to pave the way for additional models in the future.

2.3.6 Business Alliances

Finding: New forms of cross-sectoral and market alliances could augment the demand for NFM products.

Case Materials: In the region, USAID has sponsored a few demonstrations of construction using forest materials. One demonstration in Ecuador employed bamboo lattice walls in cooperation with a pilot initiative to manage bamboo forests. A demonstration in Guatemala promoted pine lumber produced from thinnings to improve the quality and safety of low-cost housing. Each of these initiatives provided additional benefits, such as reducing imports, increasing security against earthquakes (compared with concrete), and promoting employment and other multiplier effects that accompany construction.

Furniture exports appear to have excellent growth prospects, but perhaps not alone. Supply chains will have to grow, too, all the way back to the forest. Brazil and Honduras each account for a mere 1 percent share of U.S. imports of furniture—a fraction of the annual \$21 billion furniture market, 21 percent of which is supplied by imports (Molinos and Membreño 1999). Even very modest growth in market share for these exports creates a significant increase in demand for raw materials. This offers an interesting opportunity in Honduras, which needs to expand its harvest of natural pine to preserve forest health and increase forest productivity (Flores-Rodas and Santos-Zelaya 1999). The forest managers harvesting additional pine could link to both the international furniture market and a domestic market to use preserved pine in low-cost housing, schools, health posts, and other simple buildings.

Conclusion: The assessment team observed unrealized opportunities between suppliers of forest products and users or potential users of those products. USAID could be a catalyst in connecting actors in NFM with actors—both government and business—in construction, furniture, and international trade. Governments and donors find it challenging to design and execute strategies that cut across sectors as varied as housing, trade promotion, and natural resource management. Nevertheless, establishing such links may stimulate NFM.

2.3.7 Recommendations for Business and Market Development

- **Combine training in NFM with capacity building that improves business skills,** including general management, accounting and finance, and personnel management. One series of training events could be tailored to local government authorities overseeing NFM, while another could be geared to small and medium-sized enterprises. These training efforts should aim primarily at supporting the transformation of forest-based enterprises, from short-term extractive ventures, to efficient operations interested in value-added and long-term investments. An expanded effort could draw upon USAID’s successful experience in Bolivia with CADEFOR.
- **Incorporate technical assistance in market analysis into the design stage of project development.** Here, technical assistance would involve economic analysis of markets,

matching forest products with users and buyers with sellers, and expanding access of both sides to markets. The analyses, covering both domestic and international markets, could identify: availability of products, market cycles, reliability of supply and distribution systems for various products, transportation costs, and expansion trends of product demand.

- **Reengage in research, development, and extension of lesser-known species** to further understand their properties, uses, and market potential. Increased marketability of lesser-known species could lead to higher profitability of NFM and less over-harvesting of higher-value species. Additionally, this type of research and extension would contribute to an increased understanding of the marketability of these species as demand for wood continues to increase and sources of traditionally marketed tropical species decline. Following the example of Brazil, a focus on domestic markets could provide major opportunities for promoting lesser-known species of timber.
- **Design NFM projects to develop “clusters”**—alliances or partnerships between buyers and sellers of goods and services along the value chain. These clusters facilitate economies of scale and provide the advantage of increased market security and efficiency. There are opportunities for brokering such partnerships and for identifying enterprises that would become more efficient through vertical integration, either directly or through contracts with other firms or associations. Partnerships may include forest-based communities, major wood product companies, and small and medium-sized enterprises. Links between forest product industries and community-based forest management may be essential for sustainable NFM, especially if there is a commercial timber harvest component.

2.4 Social and Community Dimensions

2.4.1 Working with Local Beliefs and Behaviors

Finding: In many instances, local people see conversion of natural forests for agriculture and livestock as necessary to development, and a better alternative than leaving lands idle.

Case Materials: Small holders in the Esmeraldas region of Ecuador implement NFM on parts of their land that are still forested with considerable support from the SUBIR project, since ingrained attitudes prompt local communities to do otherwise (CARE 1999). Even in a densely populated country like Ecuador, the Esmeraldas region is still considered “the frontier,” and people see their destiny linked with dominating the jungle and bringing it under human control. Similarly, in colonized areas of Petén, Guatemala, local people can assert their tenure rights by creating *mejoras* (land improvements)—converting the forest to other uses.

Where day-to-day survival or the pursuit of modern life may be the issue, the long-term horizons of NFM have little appeal. The challenge lies in overcoming attitudes created by years of seeing others apparently getting wealthy from exploiting the forest without having to account for the losses, both environmental and productive. These attitudes are often rooted in traditions and in formal structures of rights and obligations. However, NFM requires investments in maintaining the structure and long-term productivity of natural forest ecosystems, and those who invest should be able to reap the benefits of their efforts. Changes in the structure of rights and

obligations with respect to land ownership and use can be major factors in making NFM a viable alternative to land uses motivated by currently prevailing beliefs and policies.

Conclusion: Participatory forest management is not only about technology; it is also about behavior and attitudes. Small holders can play a key role in determining the future of natural forests, particularly in colonization areas and on the agricultural frontier. To succeed, USAID's programs in community NFM need to understand local knowledge and beliefs related to forests and NFM. This will require the use staff skilled in conducting socioeconomic analyses, developing community organizations, and building the capacity of small forest-based enterprises.

2.4.2 Taking Charge—We Have the Forest, Now What Do We Do with It?

Finding: Community-based NFM requires that people get tangible returns from the forest through their own efforts.

Case Materials: In 1993, landmark legislation in Bolivia confirmed the legal rights of indigenous groups on forest lands that they had traditionally occupied (Andaluz 1996). With the assistance of BOLFOR, the Chiquitano peoples of Lomerío established a pilot scheme for NFM that includes producing certified forest products for export. This is an example of a successful community-based NFM model that can be replicated (Kraljevic 1997). SUBIR in Ecuador has pioneered the development of technical NFM prescriptions for community areas and individual farm holdings. The Central Selva Resource Management Project in the Palcazú Valley of Peru had similar objectives. In Guatemala, communities holding forest concessions seem willing and able to defend their forests against fires and colonization invasions that plague protected areas elsewhere in the Maya Biosphere Reserve (Nittler and Tschinkel 2000).

Conclusion: Gaining tenure over traditional lands and forests is an important achievement for rural communities in Latin America and the Caribbean. However, tenure alone is not sufficient for community-based NFM to succeed. Once communities have user rights over their lands, what can they produce? This is where USAID must be clear: projects in NFM are not social welfare, nor are they pure conservation. NFM requires enterprise if there is to be revenue, and the forest must in fact provide tangible things to those who work in it. The examples cited in the case materials suggest that USAID has promoted conservation in the sense of "wise use," rather than total protection, and that communities do respond favorably. BOLFOR is embarking on a new phase to channel a higher proportion of staff and budget to community NFM, particularly with indigenous communities. SUBIR, under the direction of CARE, has begun to train community para-technicians to work in NFM and train others to do the same. Thus in some places, USAID is entering a second generation of NFM that is defined by expansion from existing bases.

2.4.3 Communities and Forest Industries

Finding: The growth and development of community-based NFM may require commensurate growth and development of forest industries.

Case Materials: The case of community NFM in Petén, Guatemala, offers insight into relationships among communities, the government, NGOs, and forest industries. Government policy requires community forest concessions to obtain technical assistance from third parties,

mainly NGOs, as service providers. The rapid start-up of community forest concessions in Petén could not have happened without the hands-on nurturing of the *ONGs acompañantes*, as they are called there. However, four years later, these NGOs are not necessarily the right actors to provide expertise in business management, marketing, and production training that will maintain these community enterprises on sound footing (Alvarado et al. 2000).

Are industrial wood buyers an alternative that will help the communities? Near Bethel, Guatemala, eight community groups and farm cooperatives in a remote region along the Usumacinta River own small areas of forest, totaling 23,000 hectares. Centro Maya, the NGO that “accompanies” these communities, recognized that the communities would not be capable of adding much value to their timber. Thus Centro Maya and the community groups negotiated an arrangement with a sawmill that allows the communities to buy manufacturing services while retaining an interest in the final product. Furthermore, the communities are able to borrow money for investment and social infrastructure on the basis of their marketing agreement with the sawmill.

However, a dark cloud hangs over this alliance. Due to technological and business inefficiencies, the sawmill may not be able to continue paying current high prices. Because of the remote location, there are no other potential buyers for this timber. Thus the community’s NFM initiative could collapse because of the weaknesses and poor efficiency of a private sawmill. Furthermore, if the communities have to discontinue their initiative, the accompanying NGO’s credibility could be harmed and broad questions would be raised about the government’s policy and strategy for NFM. In other words, everyone could lose.

Conclusion: In some circumstances, partnerships between private firms and communities can generate early cash flows from NFM. Government, communities, NGOs, and industry constitute a system. However, failure of any one party can spell failure for all.

In the design of forestry development projects, USAID should consider promoting linkages between community forestry initiatives and processors and value-added markets. The key to advancing NFM is broad cooperation and a systematic approach that favors the success of all key actors.

2.4.4 Recommendations for Social and Community Dimensions

- **Promote a participatory approach throughout the design and implementation of projects and incorporate indigenous knowledge,** customs, values, and methods of social integration. In field-oriented NFM, traditional attitudes toward land use must be taken into account. Some of these may not be entirely compatible with the long-term perspective required by NFM. Therefore, the fundamental lessons learned and skills that training and technical assistance can provide must be adapted to the country and local context through the involvement of local participation in all key decisions throughout the life of the project. In particular cases, these considerations may lead to the inclusion of non-forestry components, such as farming systems, as part of NFM projects.
- **Strengthen community business and organizational skills, including finance and micro-enterprise development.** Training for communities remains an area of key importance if

communities are to be successful in NFM, particularly its commercial aspects. The purpose of this training would be not only to increase the skill base of these stakeholders. More fundamentally, the purpose would be to create the discipline necessary to engage in business in a responsible and effective manner, and, in the end, for local communities to ensure the continuity of activities on their own.

3. Concluding Remarks

3.1 Natural Forest Management: Not a Simple Subject

The present assessment confirms that natural forest management is a complex subject and that there is no unique recipe to establish NFM in all situations. The complexity arises from: a) the multiplicity of outputs, including wood, non-wood forest products, water flow control, soil protection, microclimate, and biodiversity conservation; b) the fact that some of these goods and services are traded in markets while others are not; c) the reality that goods and services not traded in markets are nonetheless “economic,” since they are demanded by societies and their supply is limited; and d) the dependence of a steady flow of these goods and services on long-term investments in keeping land resources under forest cover and establishing production systems that require waiting periods of several years.

The demand for wood and other goods and services provided by tropical forests are expected to continue to expand in the foreseeable future. At the same time, the loss and degradation of these resources in LAC will continue at alarming rates. NFM is a way to continue to produce forest-based goods and services while allowing for the conservation of the resource. Additionally, in the process of providing these goods and services to society, NFM constitutes a set of economic activities that generates employment and income for rural populations and reduces the demand for land dedicated to subsistence agriculture.

With expanding demand in the absence of NFM, increasing deforestation and degradation can be expected. While increasing the surface area protected can be a partial solution to the deforestation problem, the cost effectiveness of such an approach is debatable. The assessment found that many protected areas in the region are not actually protected, as shown by significant degradation within their boundaries. On the other hand, while NFM may result in some ecosystem modification, if users find NFM investments to their own economic advantage, they will be motivated to protect the source of this advantage, and therefore to maintain the forest cover. Under NFM, a natural ecosystem, even if slightly modified by utilization, is protected from deforestation or degradation.

While the assessment team provides conceptual grounds for NFM as an important element in a development agenda, four main objections are often raised. First, NFM promotes deforestation and forest degradation directly by damaging forests, indirectly by making them more accessible and easier to clear. Second, NFM can conflict with the interests of local people who live in or near the forest. Third, benefits from NFM are enjoyed primarily by corrupt officials and the rich. Fourth, NFM is not financially worthwhile and therefore a poor investment for donors and governments.

Even though each of these situations may be found in a number of cases, the assessment team believes that deforestation and degradation can be avoided, and that NFM can be economically advantageous for rural communities. However, if these outcomes are to become more widespread, there is a need for continued support of NFM programs.

3.2 Fundamental Conditions for NFM To Take Effect

Natural forest management, like any long-term venture requires certain fundamental conditions in order to motivate investments of time, effort and financial resources. A first basic condition is a stable overall policy environment that will allow investors to expect an economic advantage from their investment with reasonable certainty. Investors need to know what to expect in overall sociopolitical and institutional stability, macroeconomic policies, general environmental policies, access to markets, tenure rights, and regulations specific to the forest and forest product sector. Second, tenure rights on forest resources must be clear, unambiguous, and enforceable. Those who invest in NFM should be legally entitled to the exclusive collection of the proceeds of their investment. Third, markets exist where goods (including capital) can be bought and sold in free transactions at competitive prices.

Generally speaking, the more open the markets, the better defined the tenure rights; the more stable the policy environment, the better the opportunities for NFM investments. Conversely, if these three fundamental conditions are not present, NFM, like any other long-term investment has little chance of succeeding. Additionally, other incentives—technical assistance, training, concessional financing, tax exonerations, subsidies—have a good chance of being effective if the three fundamentals are present. They will probably fail to motivate investment if they are not.

3.3 A Review of the Assessment’s Major Recommendations

In an effort to support USAID assistance programs in the complex and challenging field area of NFM in the LAC region, this assessment has offered sixteen recommendations. These were detailed in Chapter 2 under four thematic headings: Policies and Institutional Development, Forest Management, Business and Market Development, and Social and Community Dimensions. However, in synthesizing the results of this assessment, we recognized issues that cut across the various thematic areas. To facilitate the prioritization of these recommendations, they have been regrouped under three crosscutting categories, and are summarized as follows:

3.3.1 Design and implementation of NFM projects

- Project designers and managers should take advantage of windows of opportunity in situations that present favorable political and economic conditions for changes in environmental policy and institutions.
- The design of pilot projects should explicitly consider their potential for expansion into larger-scale commercial ventures.
- Project design teams should analyze potential incentives for stakeholders interested in long-term NFM.
- Continued promotion of local participation in all key decisions throughout the design and implementation stages of NFM projects is essential.
- NFM project design should consider the development of “clusters”—alliances between buyers and sellers along the lifespan from resource to end-user.

- There is a continuing need to motivate governments to clarify tenure rights and obligations.

3.3.2 *Training in NFM*

- Training for communities in a number of fields, including business and organizational skills, remains a key priority if they are to be successful in NFM.
- Strengthening skills in general management, governance, and technical fields for officials of various public institutions involved in NFM presents a major opportunity to ensure continued effectiveness of USAID resources.
- Training efforts in NFM must stress links with forest-based industries, and should include personnel in communities, business enterprises, and government agencies.
- Training in technical aspects of NFM must be combined with capacity building in business skills.

3.3.3 *Technical assistance in NFM*

- Criteria and principles for certification of best management practices for NFM should be actively promoted.
- There is a need for major improvements in the knowledge of forest resources lying outside protected areas—primarily extent, cover type, condition, and legal status—and in policies that will balance their conservation and use.
- Work needs to be done in identifying critical watersheds and defining responsibilities for their management.
- Assistance in management of NFM information and lessons learned needs to be increased.
- Technical assistance in market analysis needs to be incorporated at the design stage.
- There is a need to reengage in research, development, and extension of lesser-known species.

3.4 Possible Applications of the Assessments' Recommendations

These recommendations can be applied in designing or continuing USAID assistance programs in various ways. The challenge is to enhance the understanding of potential implementations of NFM with the resources and options available to USAID. Three possible areas of emphasis are the public sector, the private sector, and rural communities.⁸

⁸ It is important to note that these are areas of emphasis, and do not exclude each other. Projects that emphasize the public sector can also include private sector or community elements.

3.4.1 Public sector

In the public sector, the major issues would lie with the three fundamental conditions: a consistent and stable policy environment, clear tenure rights, and access to markets. In some cases, USAID could be faced with very unstable political situations, implying unpredictable overall policy environments. Under such conditions, long-term investments are altogether discouraged, and there is little chance that any NFM program could be effective. More frequently encountered situations, however, involve cases in which policy environments are consistent in some sectors, but not others. There are cases in which long-term investments have consistently taken place in sectors like mining, construction, plantation crops, and manufacturing, but not in forestry. These situations may provide USAID with an opportunity to identify policy failures affecting the forestry sector and to facilitate their correction, making NFM a participant in long-term investment and economic growth. Experience has shown that these policy failures often include strict government control of forest land, excessively demanding regulations for the transfer of usage rights, restrictions regarding the marketing of forest products, heavy fiscal burdens, and limitation, or even absence, of legal prerogatives for rural communities.

The design and implementation of projects with public sector emphasis should look for situations where economic and sociopolitical conditions favor a policy environment that supports economic growth, environmental stability, long-term investments, open markets, a balanced structure of rights and obligations, and broad citizen participation. Within this policy environment, development activities can focus more specifically on overcoming the above-mentioned policy failures.

Technical assistance concentrated on the public sector will also need to emphasize major improvements in the knowledge forest resources, allowing land use plans and policies to rest on a solid understanding of their availability and potential. Additionally, in an effort to prepare public forestry officials for a greater participatory role, training efforts are needed in technical fields, as well as in governance and general management.

3.4.2 Private sector

Opportunities emphasizing the private sector should focus primarily on investments, production systems, and the marketing of goods and environmental services. An essential consideration for projects of this kind is the existence of a framework of policies, laws, and regulations favorable to private business in the forestry sector. Specific assistance efforts could include: a) improving the efficiency of production systems for wood products, including harvesting, regeneration, and wood processing; b) strengthening the marketing of wood products and non-timber forest products by identifying outlets and establishing efficient commercial linkages from the resource to the consumer; c) strengthening enforcement of laws and regulations to favor legal operators; d) developing linkages between production and conservation through reduced-impact logging, regeneration techniques, and conservation easements, which include incentives to maintain the forest cover; and e) identifying opportunities for ecotourism in particular areas, perhaps in combination with private conservation contracts.

An important consideration in the design of forestry activities that concentrate on the private sector is the development of “clusters” of related enterprises that extend from the forest to the

market. These partnerships of buyers, processors, and sellers facilitate economies of scale, as well as market security and efficiency, which constitute important incentives for private investors. Additionally, an understanding of markets and their potential needs to be incorporated in project design so pilot projects can eventually expand to commercial scales. Knowledge of markets should also include analyses regarding the potential of lesser-known species, especially as wood markets continue to expand while traditionally marketed species become scarcer.

The promotion of independent certification of management practices is an effective way to bring together economic incentives, social considerations, and environmental concerns. The active promotion of certification in combination with training in both technical aspects of forest management and business skills can considerably strengthen the participation of the private sector in sustainable NFM.

3.4.3 *Rural communities*

Opportunities for supporting rural communities should rest on a preexisting legal and institutional framework that covers the fundamentals necessary for long-term investments—consistent policies, clear tenure rights, and open markets. A situation frequently encountered in recent years is that while the necessary legislative and regulatory texts do exist, formal procedures for rural communities to actually exercise their tenure rights on the forest land they claim are extremely cumbersome. Some assistance efforts limit themselves to informing communities about the fact that they have rights on a particular forest resource area. This will accomplish little unless an effort to concretely establish sustainable management of the area in accordance with the officially granted rights is conducted at the same time. Additionally, community organizations engaged in NFM must establish market linkages as early as possible to obtain direct economic benefits. To be effective, assistance efforts supporting rural communities need to focus on concrete elements, including: a) developing the legal standing of communities, mainly the capability to enter into contracts; b) shifting from the mere recognition of tenure rights to their actual acquisition on specific tracts of land; c) simplifying bureaucratic requirements, particularly regarding management plans; d) removing regulatory barriers, especially for the commercial use of forest resources; and e) concretely reducing state control over community-based management activities.

In addition to ensuring the concrete establishment of usage rights of communities over specific forest areas, the participation of community members in all key planning and implementation decisions is an essential consideration for project design. Given the complexity of NFM, community members will need training in several subject areas including various technical aspects, basic business skills and organizational capabilities among others.

3.5 The Importance of Training

Throughout this discussion, whether the emphasis has been on the public sector, the private sector, or communities, the importance of training emerges as a paramount concern. The importance of training is due to several factors, including: the complexity of NFM; the importance of considering the complete value chain from forest to end user; the fact that the necessary collaboration between the government, communities, and enterprises constitutes a new

model; and the need for a new structure of rights and obligations in forest governance. For most stakeholders, these reasons imply significant changes from the way natural forests were used and managed in the past. Therefore, any type of assistance program, regardless of its area of emphasis must have a strong training component and must include the participation of public agencies, communities, and private enterprises covering all levels of responsibility.

The assessment team has attempted to review and discuss USAID's natural forest management experiences in the Latin America and Caribbean region, offering a number of recommendations for future action. The team hopes that this effort will contribute to USAID's efforts in facing the challenge of developing and conserving the forest resources of Latin America and the Caribbean.

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Appendix A. Bolivia

It may come as a surprise to many that Bolivia leads the developing world in sustainable forest management. The country now has more than a million hectares of lowland tropical forests certified as being sustainably managed. Even more remarkable, this achievement transpired during a short ten years in the 1990s.

Before then, development efforts in the natural resources and environment sector mainly focused on the problems of the highlands—the *altiplano*—where population pressures, land degradation, and poverty went hand in hand. Despite some achievements in soil and water conservation, improved farming practices, and plantation forestry, Bolivia's *altiplano* remains one of the most underdeveloped, if not the poorest, areas on the continent. Many of these upland areas became so degraded that they became a source of migrants to Bolivia's lowlands, which eventually helped to focus development program attention on these lowlands—areas under 500 meters' elevation.

Between the mid-1950s and the mid-1990s, Bolivia's lowlands underwent dramatic changes. In 1968 Santa Cruz de la Sierra was a sleepy little provincial town on the edge of the frontier with only one block of paved streets (around the Plaza Principal). Today it is a major metropolis with an international airport and almost a million people. To promote the colonization of the lowlands, the government gave out lands to peasant colonists, large- to medium-scale commercial farmers, and indigenous peoples. Similarly, by the late 1980s, 185 logging concessions were awarded to 173 firms with rights to parcels of forest resources in the lowlands, amounting to 22 million hectares. In many cases, these firms were little more than small-scale loggers with connections and a couple of chainsaws and who made absolutely no effort to extract timber in a managed or sustainable way. Interestingly, because land tenure laws of the time did not convey property rights over timber, concessions were awarded by the state on privately held and indigenous lands.

As the 1990s dawned, widespread injustices throughout the country and within its productive sectors led to a national economic collapse. In 1990 organized militant indigenous groups organized the March for Territory and Dignity, which brought the subject of indigenous and land rights into the limelight. Some efforts had already begun to allocate land rights to indigenous people when a wave of political reform resulted in a change in the ruling party of the national government. In the mid-1990s President Gonzalo Sanchez de Losada embarked on a major effort at decentralization. Two new laws—the Popular Participation Law of 1994 and the Administrative Decentralization Law of 1995—brought about major changes in the way land rights and land tenure issues were viewed in the lowlands (Pavez and Bojanic 1998). These changes affected the forestry sector as well.

1. Forestry Sector Overview

Bolivia's lowland tropical forests cover about 50 million hectares—equal to all of Central America and Mexico combined (USAID/Bolivia 2000). These resources are mainly found in the country's northeast, in the lowland areas of the departments of Cochabamba and La Paz and in

the departments of Santa Cruz, Beni, and Pando. This area constitutes about half the total area of the country. More diverse than the name “lowland forests” suggests, this area includes five major biotypes: the humid lowland forests of the Amazon, the seasonally flooded plains and savannah forests of the Beni, the semi-deciduous forests of the Chiquitania, the dry forests of the Chaco region, and the humid-forest types found on the *cejas de la selva* or the fringe of the hills along the highlands.

Bolivia has a long history of timber extraction, particularly for the precious hardwoods like mahogany (*Swietenia macrophylla*), Spanish cedar (*Cedrela odorata*), and roble (*Amburana cearensis*). However, as the lowlands opened up in the 1970s, little was done to enhance the effectiveness of sector development; and most activities can best be characterized as extensive high-grading of the forests for these precious hardwoods. One important land use was the extensive collection of non-wood forest products, including Brazil nuts (*Bertholletia excelsa*) and palm hearts (*Euterpe precatoria*), though both were mostly unregulated. It was largely a free-for-all, and access to forest resources was given to those with political connections without regard to the land’s occupants.

During this time, concerns raised about these irrational extraction processes and policies went largely unheeded. Despite some efforts to enhance its capacities through an FAO technical assistance project, the Forestry Development Center (CDF), Bolivia’s national forest administration, lacked the real political clout, governmental support, and budgetary resources to do its job effectively. Its capabilities were further eroded by its image as a dysfunctional and corrupt agency in league with private concessionaires. Exacerbating the situation was an almost total disregard for the rights of the local people and indigenous groups who inhabited these forest areas. According to Kaljevic (1997), “By ignoring the fact that people actually inhabited these areas and had legitimate rights to them, the previous forestry regime set the conditions for permanent conflict between timber contractors and local populations.”

2. USAID/Bolivia’s Investments in Natural Forest Management

Remarkably, USAID/Bolivia did not have a real bilateral project in the forestry sector until Bolivia Sustainable Forest Management (BOLFOR) began in 1994. Although the USAID mission can justifiably claim that its support through BOLFOR has been the cornerstone of national achievements in the forestry sector, including significant policy change and the increase in certified natural forest management, a number of other USAID initiatives laid the foundation for these results. In the late 1970s USAID established the P.L. 480, Title III program, which allocated significant funding, generated through food commodity sales, for development activities. Many of these funds went toward efforts in the natural resources and environment sector. The program’s achievements in the sector include:

- Contributions to CUMAT, a quasi-governmental group that developed a land-use capability system, which helped to quantify the challenges and opportunities for the development of the lowlands.
- Similar support for the establishment of LIDEMA (Bolivia’s environmental defense league), a coordinating body bringing together six of the country’s emerging environmental NGOs for

concerted actions and as a voice for policy dialogue representing civil society in the debate about natural resources management and environmental policy.

- An array of small-scale activities, including updating the country's environmental profile, environmental assessments of planned development activities in the lowlands, and the establishment of the Beni Biological Field Station, all of which served to raise both awareness and capabilities for participating in the national debate over the destiny of the lowlands.
- Most importantly, significant targeted support for almost all of the environment sector policy and planning studies including the General Law for the Environment and for the new Forestry Law (Catterson 2000).

Even without a major bilateral project, USAID entered the 1990s as the lead donor in the environment sector in Bolivia, and in 1992 environment issues became part of the focus of USAID's Strategic Objectives (SOs) for the country. Under the aegis of this SO, USAID launched the Bolivia Sustainable Forestry Management Project (BOLFOR) in 1994 as a design-and-implementation contract, with Chemonics International as the institutional contractor. Although BOLFOR was expected to promote a research program and establish pilot natural forest management sites, it was soon drawn into the then intensive national reform effort related to forestry sector policy and legislation.

The BOLFOR team provided technical assistance and support to the national debate among sector stakeholders, led by a Bolivian senator who was trained in natural resources (at Cornell University) and was the president's brother. In 1996 their combined efforts led to the promulgation of the new Forestry Law, which dramatically altered the face of forestry sector development efforts and set the stage for many of the significant achievements that have made Bolivia into a worldwide leader in the development of sustainable forestry management.

The 1996 Forestry Law accorded rights to indigenous groups (under the designation of *tierras comunitarias de origen*—TCOs) and also allocated some rights to informal users of the forests and their resources. As a result of the implications of these rights and a newly imposed timber land area fee (\$1 per hectare per year), the terms under which the concession firms practiced extensive selective logging for high-valued species changed forever. The outcome was dramatic: about 17 million of the 22 million hectares claimed as timber concessions were returned to the state. The timber industry in Bolivia now holds only about 5.5 million hectares of production forests on which, by law, they must practice sustainable forest management. In addition, the law made another 30 million-plus hectares of unallocated production forest lands available to four groups of potential users, including:

- Local user groups (*asociaciones sociales del lugar*), who could claim up to 20 percent of the forest lands within each municipality.
- Private property owners of large areas of timber lands.
- Other indigenous groups with territorial rights and claims to approximately 19 million hectares of land.

- Where possible, to new concessionaires (Kraljevic 1997).

Six production regions where there are concentrations of these “other” forest lands and resources have been identified as potential poles for sector development. Table A.1 summarizes the timber volume in these regions.

Table A.1 Bolivian Timber Volume by Region

Production region	Area		Volume (m ³ /ha)						Total
	Millions of hectares	Percent	Species						
			1	2	3	4	5	6	
Bajo Paragua	3.8	13	1.2	16.8	9.67	6.3	11.2	5.71	50.9
Chiquitania	6.3	22	3.55	23.6	7.92	0.64	7.2	0.45	43.4
Chore	1.6	6	0.68	43.6	18.8	12.8	8.35	4.34	88.5
Guarayos	4.2	15	0.45	25	10.4	3.03	6.04	2.23	47.2
PreAndino-Amazonico	4.1	14	2.18	30.6	14.8	7.77	15.8	5.99	77.1
Amazonia	8.8	30	2.13	21.9	16.7	14.5	33.7	26.6	115.54
Total	28.8	100	–	–	–	–	–	–	–

Note: Volume is dbh equal or greater than 20 cm. Species are: 1- precious hardwoods, 2- valuable species, 3- less valuable species, 4- species with potential, 5- species with unknown value, and 6- non-timber species.

Source: Superintendencia Forestal, adapted in STCP 2000.

The combination of new technical standards to retain rights to concession areas and the changing economic challenges for the timber industry set the stage for certification as an appropriate course of action for sector development. BOLFOR helped establish a national capacity for certifying sustainable forest management, through creation of the Bolivian Council for Voluntary Forest Certification, to take advantage of what was seen as an emerging international marketplace for certified wood products. Although the extent of this comparative advantage has yet to be fully felt in the form of premium prices for certified timber products, certification has given the country a much-needed edge in the marketplace. As a result, Bolivia has become the world’s leader among developing countries with almost one million hectares of certified, sustainably managed, natural forests.

This figure only suggests the importance of the forestry sector in the national economy; the reality is even more impressive. Forest and wood industries account for 3 percent of the GNP, generating 90,000 jobs and accounting for 11 percent of exports valued at \$109 million. The sector also contributes significantly to government revenues, with annual concession licenses (*patentes*) worth \$7.2 million and taxes amounting to \$4.6 million. These impressive statistical results issue directly from BOLFOR’s commitment early on to support private sector development in forest management and timber. Much remains to be done, given the wide-ranging needs of the private sector; and in March 2000 USAID, through BOLFOR and in association with the Cámara Forestal de Bolivia and the Santa Cruz Export Chamber, established *Centro Amazónico de Desarrollo Forestal* (CADEFOR). The center aims to provide business

management support, technical assistance, and marketing communication support to Bolivia's certified forest management sector. These services will also be extended to indigenous communities and municipal groups interested in bringing sound forest management practices and successful enterprise development to their newly acquired forestlands and resources.

In addition to its cornerstone support for industry development, BOLFOR also has worked concertedly to help the government of Bolivia establish its institutional capacity to guide and regulate ongoing sustainable forestry sector development. In this regard, BOLFOR continues to assist the Ministry of Sustainable Development with the formulation of sector policy, norms, and production plans. On the regulatory side, BOLFOR has also been instrumental in establishing the *Superintendencia Forestal*, which is charged with collecting forest fees and revenues and distributing these resources for investment purposes. An autonomous National Fund for Forestry Development (FONABOSQUE) has been set up under the ministry to administer national investments in sustainable forest management activities, though much remains to be done to make it operationally effective.

For municipal governments, BOLFOR, with the assistance of the center for International Forestry Research (CIFOR) is piloting efforts in two municipalities to develop capabilities for implementing the Forestry Law's local user group stipulation for forest management by the *Agrupaciones Sociales de Lugar* (ASLs). Finally, to continue USAID's strong support for the development of a constituency for sustainable forest management, BOLFOR has worked to help set up a new NGO—*Sociedad Boliviana de Derecho Ambiental*—as a sector-wide watchdog.

Earlier this year, USAID entered into an agreement with the Ministry of Sustainable Development to extend BOLFOR activities to the end of 2003. With CADEFOR in place to continue assistance to the private sector, BOLFOR's priority for the next three years is to help community and local government forests of the ASLs and TCOs develop and implement forest management plans on their lands. This assistance will include advice and training to communities on how to qualify for and maintain certification of their forest practices, maintaining a chain of custody on their products, and negotiate long-term timber supply contracts with certified industry buyers. A second initiative of BOLFOR will be the development of community-based wood processing facilities that would increase local value-added returns to the community using minor forest products and small-sized timber.

Other issues for BOLFOR to work on in the future include:

- Reducing incentives for the conversion of forest land to other uses through deforestation and promoting incentives for maintaining land in forest production.
- Security of title or control of forest lands, which is essential to justify investments in silvicultural practices to increase productivity.
- Financing must be made available for the costs of management planning and preparation of the *Área Anual de Aprovechamientos* (AAAs) by smaller companies and for the ASLs and TCOs, and the payment of the *patente* deducted from the sale of timber rather than prepaid as presently required.

- Promoting public auction of land, best used through sustainable forest management, to companies, with land use restricted to sustainable forestry and its conversion to other uses prohibited.

3. Issues and Opportunities

Right Time, Right Place

BOLFOR, despite its relatively recent arrival (1994) as an international forestry development program, has benefited from coming onto the scene at a propitious moment when a coincidence of factors favored its successful implementation. These factors include an awakening consciousness about the impact of deforestation on global environmental issues (biodiversity conservation and global warming); the emergence of the certification process; the declining availability of precious woods (mahogany, Spanish cedar, and roble); growing government of Bolivia resolve for sustainable environmental development; and a growing industrial capability and marketplace in Santa Cruz.

The Whole Package

BOLFOR is a fully developed and vertically integrated natural forest management (NFM) project. Its activities include advisory assistance to government at the national policy and legislative level; applied research to substantiate policy and regulatory recommendations; field demonstrations of improved forest harvesting and silvicultural practices; training of agency, industry, and NGO personnel; and market promotion of certified wood products.

Early Steps to Certification

The forest law and regulations require concession management plans and practices that are in general conformance with the requirements for Forest Stewardship Council (FSC) certification. Forest industry leaders see this as an incentive to seek full certification. They have found that the additional costs of certification are relatively small and mainly involve worker health and safety and instituting a process of community participation and concurrence.

Vested Interests and Changing Laws

The abrupt enactment and application of the Forest Law 1700 in January 1997 was a shock to the forest industry that, in most cases, had made little effort to prepare for a restructured forest sector. While a transition period of three years to full application of the law might have reduced the shock of the change, it is probable that elements within industry would have spent their energies in seeking a reversal or otherwise weakening application of the legislation. These efforts appear to be continuing, and the present government is reported to have made decisions in the Department of Pando that tend to undermine the law's application.

A Long-Term Vision for Forestry Development

Despite its impressive achievements, the success of BOLFOR efforts to create the incentives, system, and capabilities for sustainable forest management appears to be at risk—partly because of a perceived downturn in the international timber market and a weaker conviction and

commitment to NFM on the part of the present Government of Bolivia. The sustainable forest management sector and its stakeholders need a vision statement that paints a picture of the short-, medium-, and long-term directions and expectations for these activities. Even though sustainable forest management and its characteristics cannot be achieved overnight, some voice rather pessimistic views of the achievements to date, which are substantial.

Consultation Must Be Institutionalized

The promulgation of the 1996 Forestry Law was an excellent example of how consultation and debate among a wide range of interested parties—the stakeholders—resulted in successful, negotiated, sectoral policy change. This interchange should be institutionalized through the creation of a consultative advisory body, serviced by government, for resolving conflicting environment sector issues and, thereby, continuing the process for improving policy framework for sustainable forest management.

Sustainable Forest Management and Biodiversity Conservation

Sustainable forest management is not biodiversity conservation, but it is much better for biodiversity than the next alternative land use: irrational use of the forests or conversion to agriculture. Similarly, sustainably managed forests may be easier to protect than many protected areas. BOLFOR is focused on creating the full spectrum of incentives for all stakeholders to embrace sustainable forest management, which maintains forest cover as a valuable and appropriate land-use option over the long term—something that other projects should copy.

Understanding the Externalities

The forest sector restructuring that resulting from the 1996 legislation came at a time when the forest economy was hard hit by external events. In 1997, the Asian crisis affected timber markets worldwide. In 1998, Brazil devalued the reis by about half lowering the price of its timber on the world market, and, in 1999, exports continued to decline as the Mercosur economy contracted. In addition to the forest industry's reduction in income, the new law greatly increased the cost of holding forest concessions. A management plan was required for the full concession, based on an inventory and zoning of the area. In addition, 20-year rotation was established, and the AAA was set at 1/20th of the area of the concession after reductions for watercourse-leave strips and other biodiversity conservation requirements. A 100 percent inventory of the AAA was also required each year, along with payment of a *patente* of \$1 per hectare for the total area of the concession. These increased concession management costs, combined with the reduction in export and domestic sales, have resulted in half of the small sawmills being closed and a reduction in the areas of forest concessions from 22 million hectares to 5 million hectares.

Providing Services to Industry

Currently, several interesting models are either planned or in early execution around Santa Cruz. These will provide paid services to industry on a self-sustaining basis, for example:

- Earmarking part of the 0.5 percent of the timber exports by CFB members to fund the Promabosque technical center, which now includes nurseries and a CCA pressure-treating plant for income generating and training.

- The Swedish-supported initiative for establishing at the Promabosque Technical Center a saw-fitting facility, a mobile technical assistance crew that delivers machine alignment, and reconditioning services at the sawmills and millwork plants.
- A Swedish-supported bulk-purchasing facility, which can supply custom band saw teeth stamped for the different species being sawn. (In tropical countries, producers have their choices limited by one or two suppliers of ready-stamped steel.) Besides adding to the means for sustaining the center, this facility allows the Cámara Forestal to provide a tangible cost saving to its 114 members.

Future Directions for Forest Industry

Taken as a whole, the product development and industry assistance initiatives started or planned by USAID with CADEFOR, along with Sweden and the Cámara Forestal de Bolivia, are a good start in the right direction. However, they must be better coordinated and then strategically expanded in scope and depth, using a comprehensive cluster strategy and long-term vision. Two mutually dependent goals for Bolivia's forest product industry are to become globally competitive and to generate the revenues needed to expand the natural production forests being conserved through certified NFM. Areas that merit increased attention include:

- Increased emphasis on harvesting more species and marketing lower grades of timbers to local and regional construction markets and smaller specialized manufacturers.
- More hands-on efforts to demonstrate how to improve yields and reduce costs in the forest and in the plants and to evaluate their savings for different producers.
- Promoting and facilitating linkages between smaller and mid-sized firms and community projects with larger firms with more sophisticated processing and marketing capacities.
- A more strategic networking of project efforts aimed at building local training capacities at managerial, technical, and vocational levels.

Reforestation Is Not the Solution to Deforestation

One of the most serious policy issues is the impact of the deforestation permits, whose lower cost and relative ease of permitting allows or induces landowners to clear land rather than abide by the more stringent restrictions and guidance for sustainable forest management. In some cases, the more successful wood industries are subsidiaries of larger agro-industrial firms with a vested interest in land clearing. Bolivia has a relatively sophisticated series of land capability (*uso mejor de la tierra*) maps that cover the lowlands in the Santa Cruz area. However, it is not clear that these are being used properly because of political interference in the policy process or the lack of an understanding of the real costs of conversion of lands unsuited to agriculture to cash crops. Amazingly, Ministry of Agriculture authorities are talking about the need for a reforestation incentive program to replant degraded areas in the lowlands. Regrettably, such an approach may reinforce the mistaken notion that reforestation alone is the solution to deforestation and, thus, undermine the conviction that sustainable forest management is an appropriate land-use option that allows for both conservation and production.

Sound Management Practices Should Lead to Business Skills, Too

Reduced-impact logging, sustainable forest management, and certified forestry have important impacts in terms of the achievements of operational capabilities and efficiencies within the organizations pursuing these strategies. These approaches should go beyond covering the incremental costs of such practices in that they strengthen the competitive position of an industry that better understands its internal cost structure and how to improve it in a challenging marketplace.

Building the Case for Sustainable Management

The benefits of the BOLFOR project to the forest sector of Bolivia have been gradually acknowledged and increasingly supported by certain industry leaders. The Cámara Forestal, which previously opposed the new Forest Law, has accepted that it must comply with the law and now looks for certification and value-added timber products to become profitable. Higher concession management costs serve as an incentive for the industry to increase the efficiency of forest operations and to invest in improved processing facilities to add value to their products. Companies that have certified at least part of their operations now have access to European markets. Members of the Cámara Forestal are thinking of increasing the area of certified forest from 890,000 to 2 million hectares in the near future.

An Unfinished Agenda Elsewhere

Bolivia's altiplano constitutes an unfinished development agenda, and conditions there exert significant influence and pressure upon the eventual outcome of efforts for sustainable forestry and appropriate land use in the lowland tropics. Alternative development associated with coca eradication (for which there has been notable successes in Bolivia), along with land adjudication struggles related to indigenous land rights also affect the outcome of sustainable forest management in Bolivia.

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Appendix B. Brazil

Brazil contains 3.7 million square kilometers of moist tropical forests—26 percent of the world’s total—largely in the Amazon Basin. Conservation of the Amazon forests has become a global priority, as they are exposed to the same threats that devastated the Atlantic Forest and reduced it to 7 percent of its initial range. Responding to this concern, Brazil made a commitment in 1998 to the World Bank–World Wildlife Fund Alliance to conserve 25 million hectares of forest in the Amazon through the establishment of new protected areas. President Cardoso began this initiative by signing decrees to establish four new major forest reserves. However, protected areas are not sufficient to conserve the biological diversity of that huge forest nor to sustain the supply of the essential products and services that it provides. Safeguarding the full range of social, environmental, and economic benefits for the country and meeting global priorities will require sustainable natural forest management (NFM) of the vast areas outside of established reserves.

With few exceptions, sustainable NFM is not practiced in Brazil. Amazonian forests continue to be open to exploitive development; timber extraction; agricultural expansion; and infrastructure investments, particularly roads. The landless must convert forests to agriculture to sustain their livelihood. Development interests have strong economic incentives to convert the forests to industrial agricultural enterprises and take advantage of profitable agricultural exports. Further, national and international demands for tropical timbers have increased as the forests of East Asia become exhausted. As long as competing land uses are more profitable than sustainable management, deforestation of the Amazon will continue.

USAID’s environmental program in Brazil promotes sustainable natural forest management as a means to achieve global goals of conserving biological diversity and reducing greenhouse gas emissions. These efforts have resulted in evident progress: USAID funding of national and international NGOs has increased national awareness and support of forest protection and management through investments in research by government agencies on the prevention and suppression of wildfires. Agroforestry projects by small farmers are advancing the restoration of degraded forestland. USAID and U.S. Forest Service support of demonstrations and training on reduced-impact logging practices are promoting industry adoption of forest practices that will improve the profitability of sustainable forest management in the Amazon and reduce the incentives for conversion of the Amazon to other uses.

Table B.1 Indicative U.S. Government Funding Levels for NFM in Brazil

Activities	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	Total
Forest Management Research and Training	\$100,000	\$90,000	\$50,000	\$50,000	\$50,000	\$340,000
Fire Prevention and Environmental Change	\$115,000	\$110,000	\$150,000	\$150,000	\$150,000	\$675,000
TFF Demonstration and Training (RIL)	\$120,000	\$100,000	\$100,000	\$200,000	\$300,000	\$820,000
USFS/TFF Cost Benefit Study	\$90,000	\$25,000		\$135,000		\$250,000
USAID/Institute of Tropical Forestry					\$125,000	\$125,000
Total	\$425,000	\$325,000	\$300,000	\$535,000	\$625,000	\$2,210,000

1. Forest Sector Overview

Amazon Forest Degradation

Official deforestation statistics for the year 2000 have not been released. In May, preliminary data from the National Space Research Institute (INPE) estimated that the annual clearing of the Amazon forests had increased from 17,259 km² in 1999 to 19,382 km² in 2000—a 15 percent increase. Despite mounting efforts of the national government to control land use and slow the conversion of the forest to agriculture or other “productive” uses, deforestation will continue.

Natural forest use cannot be stopped in Brazil, nor should it—the industry is too important to the country’s economy. Brazil is the largest consumer of tropical wood in the world, using about 86 percent of the timber it harvests. Brazil’s forest products rate second only to iron and steel as a primary economic sector, and gross sales of tropical hardwoods generate an estimated \$1 billion a year. Forest-based employment was 11 percent of the primary work force in 1999, and the value of forest product exports was 7 percent of total exports in 1998. This export demand is growing as the supply of tropical timber from Asia decreases. Brazil’s priority must be a reduction in the destruction of the natural forests and the promotion of sustainable forest management by the forest industry.

The Priority of Roads for Development

Avança Brasil, the national economic development plan, proposes to expand the length of paved highways in the Amazon from 12,000 to 18,000 kilometers. This action alone would nearly double the area cleared of forest within 50 kilometers of a paved highway from 16 percent to 28 percent. This plan is causing great concern for the future of the Amazon forests, both internationally and within Brazil. A recent study, published in *Forest Policy and Management* by Daniel Nepsted and others, analyzed the impacts of paving roads on the forest. Settlers within 50 kilometers of a paved road were found to clear an average of 32 percent of the surrounding forests. Settlers within the same distance from an unpaved road clear only 5 percent of the forest.

Based on this observation, Nepsted estimated that paving an additional 6,000 kilometers has the potential to degrade 120,000–270,000 square kilometers of forest (Nepsted et al. 1999). Paved roads lower transportation costs and bring more income to farmers, so an immediate incentive arises to increase the area in cultivation. Likewise, improved roads give loggers added ease in illegally entering indigenous reserves, protected areas, and private lands. Additionally, studies have shown that accidental forest fires occur more commonly near agricultural and logging areas.

Efforts to halt the paving of roads are not a solution to this issue; at best, they only serve as a delaying tactic until more effective land use controls and forest regulations are in place. An estimated 400,000 people will benefit from paving the Trans-Amazon highway from Altamira to Marabá in Pará. The issue becomes how to minimize the forest destruction that has traditionally followed improved access to the forest frontier from road construction and improvement. Policies and regulations that give incentives for better forest management are essential, and resource agencies need the political will and improved operational capability to apply forest regulations and control land use.

Natural Forests Are Unmanaged

The Brazilian Forestry Code (Law No.4.771/65) requires that all harvesting of natural forest must use sustainable forest management practices that maintain a healthy ecosystem. Despite the regulations contained in the law, illegal timber extraction is widespread in the Amazon Basin. A 1995 EMBRAPA study of forest management for timber in Pará found that woods operations were poorly managed or that supervision in the field was completely lacking. Conventional logging operations had excessive costs and caused extensive damage to the residual forest. Many of the management plans were found to be a cover for illegally harvesting timber to clear land for agriculture. It is estimated that only about 2 percent of the harvested timber comes from forests managed in accordance with regulations. Another 80 percent is quasi-legal but harvested without management plans or technical supervision as a first step in the conversion of forest to agriculture or pasture for livestock. Under these circumstances, Brazil finds it difficult to meet International Tropical Timber Organization (ITTO) Goal 2000 that all tropical timber exported by a country have its origins in forests under sustainable management.

Brazilian agencies recognized that NFM requires long-term control of the resource, either by purchase of the land, long-term lease, or forest concessions. EMBRAPA is reported to be developing a forest concession program for established or proposed national forests. At present, only the Tapajós National Forest (FLONA) has a long-term management agreement in place in research and demonstration of a reduced-impact logging project.

Forest Regulations

The Brazilian Environmental Institute (IBAMA) is the agency responsible for setting environmental standards for natural resource management. Its ineffectiveness in enforcing forest management regulations is widely acknowledged by people within that agency, as well as by industry. Existing forest regulations are unclear, often directly in conflict with economic incentives, and inconsistent in application. With illegal wood commonly available at low prices, the forest industry has little incentive to go through the bureaucratic process needed to obtain

legal permission to harvest timber. Without qualified personnel capable of overseeing compliance, forest regulations are commonly ignored.

Recognizing the inability of federal agencies to supervise forest operations effectively, Brazil has begun to delegate the application of forest regulations to state and local governments. State governments are empowered to enact legislation and regulations governing resource use suited to their specific conditions and requirements, although local regulations must not be less restrictive than national laws. Concern exists that local governments may be lax in enforcing forest regulations in order to attract development investments. Experience has shown that the local timber industry and other development interests have the political influence to avoid compliance with environmental legislation and land use regulations. State and local government agencies in the Amazon have limited capability to establish and enforce forest regulations and to monitor land use and management practices.

Forest Land Tenure Issues

Security of land tenure is a critical and often dangerous issue throughout Brazil—especially in frontier areas where land ownership records are antiquated or do not exist and forest values are high. Often, there are conflicting titles, property boundaries are inexact, and the land is occupied by squatters. Lack of definite title or long-term tenure rights encourages immediate over harvest, since there is no assurance of continued access to resources in the future.

Brazilian law recognizes the rights of indigenous peoples to 82 million hectares, or about 16.4 percent of the Legal Amazon. Recognition of an indigenous reserve requires a formal identification of the land, boundary demarcation, and issuance of a decree. In 1994, an indigenous lands program was prepared to complete the legalization and assist in the protection and management of 121 indigenous areas in the Amazon. By 1997 identification fieldwork was completed on 11 indigenous reserves; and 29 demarcations were in progress, with 17 close to becoming fully legalized. The native communities are legally authorized to harvest timber and non-timber extractive uses based on an approved management plan. The management plan must be based the operating area being zoned as suitable for exploitation, an inventory of the resource, and the requirement of utilization practices that will maintain a healthy ecosystem. Because the local community is often not fully aware of its legally defined rights and boundaries, the reserves are targets for fraudulent exploitation or outright timber trespass. Thus, the local community must take an active role in protecting its lands from illegal users.

Forest Certification

Until recently, few of the forest industries operating in the Amazon were interested in certification. With 86 percent of their production going to the domestic market (which did not require certification) and the high cost of changing to well-managed operations, they had no incentive to change from conventional practices. This has changed with the success of the company, Precious Woods Amazon, which receives a price premium for exports to Europe. Producers hope to receive additional benefits from certification, including improved market access, particularly to European buyers who are restricted to certified wood products, and improved access to credit or investments from sources of capital.

The increased interest in certification, has led EMBRAPA and CIFOR to design a collaborative research project to promote better forest management practices by industry. The goals of the project are threefold:

1. Develop, test, and evaluate appropriate management systems for sustainable forest use.
2. Promote the adoption of a validated sustainable management system in the Brazilian Amazon.
3. Support research that will establish a scientific basis for sustainable management practices under existing and changing ecological, social, and economic conditions.

The project is being implemented jointly with a forest enterprise, *Jurua Madeiras Ltda.*, in collaboration with local and regional institutions. Among the early lessons learned was the need for better organization and supervision of industrial forest operations. Lack of trained personnel was determined to be the most serious impediment to good forest management practices. Further, far more demonstration and training sites are needed to provide the trained personnel that industry demands.

NFM Demonstration and Training

Fundação Florestal Tropical, a subsidiary of the U.S. Tropical Forest Foundation (TFF), began a reduced-impact logging (RIL) demonstration and training project in the state of Para in 1997. TFF's mission is to promote the management of tropical forests for the sustainable production of timber and other commodities. Formed in 1991 by individuals associated with the importation of tropical timbers, forest industries, the Smithsonian Institution, and the World Wildlife Fund, TFF is governed by an international board composed of representatives of industry from Brazil, Africa, Indonesia, and the United States. CIFOR, IUCN, Tropenbos, WWF, and TNC are on the board, along with university researchers and trade organizations. Representatives of the U.S. Forest Service and the USAID Global Bureau attend the board meetings in an advisory capacity.

The advantages of RIL practices demonstrated by the Fundação Florestal Tropical over conventional logging were confirmed in a multi-year study, *Financial Costs and Benefits of Reduced Impact Logging Relative to Conventional Logging in the Eastern Amazon* (Holmes et al. 1999). The study found that RIL costs were 12 percent less than those of conventional logging. There was better recovery of merchantable volume from the forest, and the residual damage to future crop trees and ground disturbance was significantly reduced. Additional benefits of RIL practices appear to be an increase in the productivity and value of the residual stand and the minimal impacts on the ecology forest. The Holmes study also found that a number of factors hindered the adoption of RIL practices: (1) a perception that RIL was more expensive than conventional practices; (2) lack of cost analysis and inadequate accounting practices of forest operations by industry; (3) failure to account for machine replacement and amortization of development costs; (4) lack of enforcement of forest practices regulations in conventional logging, and (5) lack of trained workers and field supervisory personnel.

The major benefit from this RIL demonstration and training is the upgrading of the operational capabilities and efficiency of industry personnel. FFT provides hands-on training to woods workers, foremen, and supervisory personnel from industry and public agencies. This USAID-

supported program is based on a partnership with five timber companies and has attracted increasing interest in training from the logging industry to the Brazilian government agencies. With USAID support, participants from Bolivia and Guyana have received training at the FFT demonstration site in Brazil. FFT has given 14 training courses with 210 management-level participants. Two timber companies, CIKEL and Gethal, have adopted RIL practices after their personnel were trained by FFT. These companies recognized the cost advantages and other benefits that can result, and Gethal has subsequently been certified by FSC.

2. USAID/Brazil's Investments in Natural Forest Management

Without a formal bilateral agreement with the government, the USAID mission in Brazil has limited financial resources to address global issues in the biggest country in the hemisphere. The success of the mission's environmental program is due to its partnership with strong U.S. NGOs and other institutions. USAID is able to act as a catalyst for national consideration of globally important issues and for laying the groundwork for progress in reducing the threat to biodiversity and the loss of natural forests. By working directly with international NGOs and with Brazilian and American universities and institutes, it uses its limited resources to leverage and complement funds from other donors. The USAID/Brazil environmental and natural resources program deserves closer study as a uniquely effective model for influencing policy changes in a country highly sensitive to foreign suggestions on policy issues or resource use. Through its support of local NGOs that are concerned with policy and governance issues, it has been able to influence national and local policy decisions and to lay the groundwork for the expansion of programs on resource use.

For example, the mission has the ability to play a leading role in the Pilot Project to Conserve the Brazilian Rain Forest (PPG); seven donor countries, together with the World Bank and the government of Brazil, have established a \$350-million fund to finance this initiative. Although the United States has pledged \$10 million and contributed only \$3 million so far, USAID is successfully guiding use of the funds and promoting collaboration among governmental and private (foundation) donors. This has been a significant contribution to natural forest management and conservation in Brazil.

USAID/Brazil's strategic objective is to seek the "environmentally and socio-economically sustainable alternatives for sound land use." Its investments are designed to reduce greenhouse gas emissions, conserve biological diversity, and promote sustainable NFM. It supports four actions that will reduce deforestation:

- *Protected area management* plans have been developed by national NGOs working with the support of international conservation groups (WWF, CI, and TNC). The plans address priority areas for the conservation of biological diversity and include national parks, extractive reserves, and indigenous reserves where limited timber harvesting is permitted. IBAMA has approved the plans and has proposed them as models for other protected areas throughout Brazil, including locations in the Atlantic Coastal Forest, the state of Amapá, Acre in the Amazon, and southern Bahía.
- *Agroforestry systems* in the state of Acre aim to diversify small-scale agriculture in sustainable ways as an alternative to slash-and-burn practices. The program of PESACRE

(Group for Research and Extension), with the University of Florida, will develop a technical and institutional basis for the formulation of agrarian policies that reduce deforestation pressures. It also hopes to increase farm incomes, reduce environmental impacts, and encourage stable settlement pattern in partnership with the Woods Hole Research Center and the Amazon Institute for Environmental Research (IPAM).

- *Fire research and monitoring* has been increased in response to the El Niño drought of 1997–98 that led to catastrophic burning in the southern Amazon. USAID supports the studies of the Woods Hole Research Center and its partner, IPAM, in collaboration with NASA and the USFS to quantify the effects of the burning. The USFS is working with IBAMA to increase fire-control effectiveness. This includes fire preparedness planning with communities; fire risk information analysis and dissemination; and training in fire-control techniques.
- *Reduced-impact logging* research, demonstration, and training is supported as an alternative to conventional destructive logging practices. The policy studies and research work of IMAZON (Institute for Man in the Amazon) has demonstrated growing success in effecting changes in policy and public awareness of conservation issues. The RIL training program of Fundação Florestal Tropical demonstrates the cost benefits of improved planning of forest operations and effective supervision of harvesting. Additional funding from the USFS is used for assessing fire risk in RIL areas as compared with traditional (conventional) selective logging practices.

The work of the Fundação Florestal Tropical RIL demonstration and training program offers the most relevance for increasing the effectiveness of NFM in the Amazon. A third of the budget for this program comes from USFS appropriations, the USAID Global Bureau, and the Brazil mission. TFF supporters finance the balance with significant machinery-time support from the Caterpillar Company. While USAID/Brazil has effectively leveraged CIFOR, PPG-7, ITTO, and other funding in support of the RIL program implemented by the Fundação Florestal Tropical, the training's success is recognized by industry and government in Brazil and internationally. USAID, CIFOR and other donors plan to duplicate the program in southeast Asia and Africa in the future.

3. Issues and Opportunities

Conservation of the Amazon Forest

A recent publication of the World Bank and IMAZON (Schneider et al. 2000) argues that agriculture in the Amazon is not sustainable where the rainfall exceeds 2,200 mm each year. These humid areas have more pests, diseases, and weeds and produce lower crop yields. Only 3 percent of the Amazon has been cleared for agriculture, and these areas are more frequently abandoned after short occupation compared with drier regions. For these reasons, those who see the Amazon as a safety valve for population growth and landless peasants are in error. The permanent vocation of at least 45 percent of the Amazon, the humid areas, is in forests. Development programs that advocate settlement in these areas are short sighted. Timber from land clearing may provide immediate income, but at the cost of depletion of the productive capacity of the soil and the sure impoverishment of the settlers.

Schneider and his colleagues recommend that the government of Brazil create more national forests, where certified companies will be allowed to manage the forest for sustainable timber production. They advocate dedicating 14 percent of the Amazon to national forests; currently only 1.6 percent is so dedicated. In addition, they recommend that 28 percent of the forest be designated as protected areas and indigenous territories. Indigenous lands may be zoned for timber harvest and other extractive uses, as well as for protection as nature reserves. The objective of national policy should be to place as much of the Amazon and forest biomes under competent management as possible, irrespective of whether the land is private or public, an indigenous reserve, or a protected area.

Continuity of Forest Management

Unless national and state governments assume overall control of forest use, unsustainable logging and extensive cattle ranching will eventually reach the humid forests. Once the humid forests are mined for valuable species, they will be left degraded. An industry that has only short-term cutting contracts has no economic incentive to invest in all-weather roads and apply reduced-impact harvesting practices and other silvicultural treatments that would increase the forest productivity and the value of future harvests.

Multipurpose use of national and state forests requires active field management by a competent, well-financed resource agency providing management continuity. Long-term concessions to the forest industry should be considered when public agencies do not have the human and financial resources for effective management. Brazil's national forests do not have an established program of awarding long-term concessions for forest management, although one is in development. Under a concession system, the functions of public agency personnel would be reduced to review and approval of management plans prepared by concessionaires and monitoring compliance in the field. Concession agreements should be designed to provide management continuity beyond one or two cutting periods if the terms of the management plan are fulfilled.

Certification of Forest Management

Forest regulations and concession agreements should require forest operations to meet standards of sustainable forest management that approach those required for FSC certification. This would enable a timber operation to meet the criteria and indicators needed for full certification with little additional investment. The actions that would usually have to be added are those dealing with improved employee working conditions and safety and the requirement for community consultation and awareness. While certification of forest stewardship is essential for those industries aiming at export to buyers that require certification, there are advantages in being certified for the domestic market in. A buyers' group has been formed in Brazil that pledged to use only certified wood, and this market will likely increase. Certification also gives the producer the opportunity to sell or exchange logs to an exporter, who will require chain-of-custody evidence of the source of the raw material.

The requirement that forest concessions meet or approach the standards for certification within a specified time, perhaps two years from beginning operations, should be included in the concession agreement. The management plan approved for the concession would specify the criteria and indicators that the operation must meet. For large and well-financed timber

companies, the costs of full certification of a concession will be minimal. For smaller companies, and community-owned operations, the costs of certification and technical advice may be excessive. NGOs and development institutions should consider establishing a rotating fund that lends money for certification to small timber operations. The loans would be repaid from the sale of certified forest products, hopefully sold at a premium over uncertified production.

Paralleling efforts to use certification to accomplish forest conservation objectives and social and environmental goals, the control of illegal logs from unmanaged land clearing must be addressed. Even though this cheap timber may not be able to enter the export market, its availability will lower the demand and price for wood from legal and well-managed forest concessions. Federal and local resource agencies must establish the mechanisms necessary for effective control of land use and development, with fines for unauthorized land clearing for agriculture or timber trespass that places illegally produced timber on the market.

Forest Management Training

The success of the RIL demonstration and training program of the Fundação Florestal Tropical is well recognized in the Amazon and in nearby countries. While the demonstrating well-known logging practices, the training's unique feature is the hands-on experience received by the trainees who actually do the work. The other key to the training's success is the emphasis on careful planning of the logging operations, followed by supervision of the logging program. This planning and supervisory experience is useful to public agency personnel, who have to inspect the management of forest concessions and cutting permits, and to industry personnel responsible for timber harvest on concessions or private lands.

A consensus exists that a permanent demonstration and training center should be established in the Amazon using the FFT instructional program. The center would also have a program of applied research on silvicultural practices and forest dynamics in addition to RIL practices. Questions remain on the location, management, and financing of the center. Ideally, the site should be a concession, national or state forest, or a large private ownership for demonstration purposes. A foundation or NGO should be formed in Brazil to establish and manage the center. The governing board would include representatives of the forest product industry; local forestry educational and research institutions; and NGOs, such as IMAZON, the Smithsonian, and TFF. Funds raised should pay for the center's start-up costs, with student fees, paid for by the sponsoring agency or company, covering operational expense and by the sale of logs harvested by the training center on its forest concession.

Forest Sector Profitability

Efforts to increase the NFM profitability do not end with reduced impact logging in the forest. A major cost is the transportation of the log from the forest to the mill, often estimated as more than 60 percent of the delivered log cost. Improved or paved all weather roads speed up the delivery of logs to the mill, reduce truck maintenance and fuel costs of the logging trucks, and lower overall log costs. In the mill, the volume of lumber recovered from logs is reported to run about 38 percent of total log volume. Increased investment in machinery and training of sawyers and other personnel are estimated to increase recovery to 48 percent (depending on size of log).

Where these increases in log yield are achieved, there is a 33 percent increase in product, or a comparable reduction in raw material cost.

Large forest products companies, particularly those producing for export, generally have the financing to improve their processing efficiency and reduce transportation costs. Smaller operations, community sawmills or indigenous enterprises lack the access to capital, machinery and technical expertise that is needed to operate efficiently. They are also not normally in a position to store a large product inventory to season the lumber and to wait for favorable market of certain species. An institute should be created, perhaps attached to the FFT training center, to assist small industries in lower product costs while increasing value.

USAID/Brazil Natural Forest Program

The Brazil mission of USAID has had an environmental program since the late 1990s that is focused on the Amazon. Without a bilateral agreement with the government of Brazil USAID has implemented its activities through U.S. NGOs and their Brazilian affiliates, and with U.S. government agencies and academic institutions. USAID has used these diverse partnerships have been successful in developing a cohesive program that advances environmental and forest conservation issues on several fronts. This has raised public awareness of these issues throughout Brazil, and is helping the local partners to build a consensus in support of the implementation of actions to improve environmental management institutions and policies. Through its association and support of local NGOs on policy and program issues USAID has been able to influence policy in Brazil without the appearance of intervention in local affairs.

Other USAID missions should consider the catalytic foundation mode of USAID/Brazil in countries where national sensitivities are high, and limited funding can be used in a flexible and opportunistic program. The environmental program in Brazil should continue its present orientation and priorities in supporting natural forest management. This action could be strengthened with the development of additional partnerships with local NGOs that are within civil society, involve local people, and draw on the relative strengths of the private sector.

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Appendix C. Costa Rica

This summary of USAID's experience in natural forest management in Costa Rica is based on a review of program documents and evaluation reports provided to the LAC Assessment Team. It was further supplemented with personal contacts with foresters and natural resource specialists who participated in forest management issues in there at the time of USAID assistance. While bi-national assistance was phased out in 1996 with the withdrawal of the country mission, USAID continues support to natural forest management (NFM) through regional programs for Central America based in Guatemala. USAID also continues its support to CATIE (Tropical Agriculture Center for Education and Research) in Turrialba, Costa Rica. CATIE has been contracted by USAID to support forest management and rural development programs in the region through training and research.

This summary considers the three most recent USAID projects in Costa Rica with a natural forest management component: BOSCOA (1987–96), FORESTA (1989–96), REFORMA (1993–97). In each case, a brief description of the project purposes and the implementing agency is given. The comments of evaluations are summarized and the lessons learned presented. A final section presents common problems noted in all three projects to be used in the final report on USAID experience in natural forest management projects in seven countries in Latin America.

1. Forestry Sector Overview

Costa Rica is justly famous its efforts in economic and social progress in raising living standards and per capita income. Education and high literacy, expanding health services, and low infant mortality set it apart from other countries in Latin America. Investments in technology and computer chip production and an international service sector provide a basis for sustaining growth in the future. Early recognition of the potential of its natural resources to attract tourists has developed to a level that foreign visitors have surpassed agriculture as the leading earning of foreign exchange. To enhance the attraction of its mountains and beaches, a National Conservation Areas System (SINAC) has been established to protect the national parks and equivalent reserves that include a tenth of the area of the country.

These efforts to conserve the forests of the country began in the 1970s with the recognition of the increasing rate of deforestation outside of the national parks. At that time, natural forests extended throughout more than half the country. Twenty years later, it was estimated that the areas in forest had been reduced to one fourth of Costa Rica. The fear expressed by conservation leader Alvaro Ugalde and others was that of a future national landscape of green islands, the national parks, surrounded by devastation. The principle cause of deforestation is not just the demand for forest products, but also the increasing demand for agricultural land. Less than 30 percent of the country is considered appropriate for even the most limited agricultural uses, but over 60 percent is used for agriculture, grazing, and urban development. The depletion of the forests is projected to result in the import of needed wood products in excess of \$200 million by the year 2000. The costs of the loss in biological diversity, watershed services, and tourism that will result are incalculable.

The creation of SINAC is the ambitious response that has been taken to forestall the economic and social costs that could result. Around each national park and critical watershed, a large conservation areas has been designated. These areas will be managed to buffer the impacts of deforestation and grading land uses from affecting the parks. In these areas, deforestation will be halted and forest cover will be restored. This will be accomplished by activities that manage sustainable production from the remaining natural forest, reforest degraded pastures and areas too steep for agriculture, and introduce agroforestry practices and perennial crops to hillside farmers. Both BOSCOA and FORESTA have these components in addition to natural forest management objectives.

2. USAID/Costa Rica's Investments in Natural Forest Management

BOSCOA

The Fundación Neotropica, through a partnership with grassroots organizations, implemented the Forest Conservation and Management Project (BOSCOA). The goal of BOSCOA was to maintain forest cover for productive and natural resource conservation in the buffer areas surrounding Corcovado National Park in the Osa Peninsula. Its purpose was to develop and demonstrate natural forest management, sustainable agriculture, ecotourism, and biodiversity technologies that are economically productive and contribute to the maintenance of forest cover. The project has eight technical components: forestry, agriculture, training and commercialization, land titling, the FIPROSA trust fund, environmental education, and environmental protection measures.

The Hitz (1994) evaluation identified many failures in implementing BOSCOA. Despite enthusiasm and dedication, the staff was unable to follow through on the numerous actions that were started. Overloaded with the variety and complexity of the many project components, project staff also tried to compensate for the lack of program support from government agencies by taking on additional responsibilities that should have been provided by other institutions. Although many factors outside its control impeded project success, it would appear that Fundación Neotropica was unable to provide effective overall management direction and administrative support to BOSCOA. Coordination was absent in the overall implementation strategy to define priorities and helped to integrate all components.

Perhaps the most serious problem was the lack of integration among field-level activities in the work with communities. A case in point was natural forest management unconnected with community extension work. Likewise, environmental education was implemented as a separate activity from efforts at the field level. Field staff often worked essentially on their own rather than as a team. Uncertain training lacked follow-through with advisory assistance. Information was not shared among the field staff or with the communities that had invested their labor in reforestation and in planting crops for which markets were not developed. By spreading themselves too thinly, potentially good projects were mismanaged and lost. Staff became demoralized, left the project, and were not replaced. In some cases, the communities rejected further involvement in the project.

The natural forest management component was intended to increase community awareness of the value of maintaining their standing timber. Selective cutting of the mature trees while allowing

the residual forest to continue to grow was intended to net more income to the community than would indiscriminate and unplanned cutting. However, the community experienced a different result. Slow approval or rejection of management plans diminished interest in the process. Management plans of the many “landowners” that did not have formal title to their forest were rejected. Those plans that did receive approval were considered a cutting permit rather than a management plan. The cutting rights were sold to lumber companies that then over cut the forest, damaged the residual stand, wasted wood, and reduced the income to the landowner. To correct this problem BOSCOA implemented a policy of requiring the landowners to contact a staff member to supervise harvesting in accordance with the management plan.

The Hitz evaluation states that jobs created by BOSCOA in the local sawmill and carpentry shop have ceased to exist without explaining the cause. Therefore, local efforts as a value added from forest utilization seem not to have continued.

Specific recommendations for the natural forest management component include:

- Concentrate forest efforts in carrying out a smaller number of projects well rather than aiming for large areas under management or the number of hectares replanted.
- Improve and simplify the preparation and approval of forest management plans, and require the supervision of forest operations by trained technicians.
- Emphasize economically productive forestry activities that help local people meet subsistence and cash needs.
- Ensure the needed and detailed financial and economic analysis of forest management activities to provide a viable alternative for local communities.
- Respond to requirements of natural forest management by small landowners and communities for incentive payments for the protection of standing trees and sustainable forest practices (see FORESTA section).

Fundación Neotropica has experienced some successes in implementing the BOSCOA project. Several good ideas have been tested and lessons learned. Community organization is stronger in the project area, and various components have generated increased cash income for local communities. The outlook for increased employment is good from the promotion of the roots and tubers crops on a year-round basis. Tourism projects in the planning stage could also offer full-time employment for community members. While the ideal is to employ local people to administer these projects, initially this type of expertise will have to be hired from outside the Osa region.

The lasting benefit of the BOSCOA project maybe the experience that the Fundación Neotropica has gained from implementing a complex project at the community level. The benefits of realistic strategic planning, setting reasonable goals, coordinating field activities, and investing heavily in strengthened community development and training are important lessons.

FORESTA

The Forest Resources for a Stable Environment Project (FORESTA) is the flagship of USAID's efforts to promote natural forest management in Costa Rica. It was designed as a regional effort to support ecologically sound, long-term economic development of the parks and buffer areas in the central volcanic Cordillera region. The goal of FORESTA was "to support Costa Rica's long-term economic development by conserving and developing its renewable natural resources upon which sustainable economic growth depends" (Bathrick 1994). Its purpose was to develop economically and ecologically appropriate land uses in the buffer areas of the Central Cordillera, and to support the management of these protected areas. An independent private foundation, FUNDECOR, was created to provide direction, technical assistance, coordination, and funding to improve management of national parks and other protected reserves in the project area, promote sustainable management and production of the natural forests of park buffer areas, and help project-area residents improve their land by integrating trees into their farming systems.

The natural forest management component of FORESTA is designed to halt further destruction of the natural forests of the Cordillera Central by:

- Promoting the preparation and execution of forest management plans that minimize the impacts of road construction, tree felling and extraction, and other silvicultural practices.
- Developing guidelines for sustainable logging of natural forests by forest contractors and landowners and managers.
- Working with the General Forestry Directorate to simplify procedures for the preparation and approval of forest management plans.
- Assisting landowners to obtain title to the forestlands they wish to manage.

FORESTA has four components: institution building of agencies and NGOs to carry out sustainable forest management, introducing technological changes to improve forest management practices and techniques, promoting education and public awareness of the value of managing forests, and policy reform to enhance economic and other incentives for sustainable forest management.

FUNDECOR has achieved significant success in the implementation of the four design components by concentrating education and training on resource users and owners, loggers, and landowners in its Cordillera Central reforestation and natural forest management programs.

- Owners of more than 8,000 hectares of forests in the Cordillera Central have contracted with FUNDECOR for assistance in managing their land for timber production in a sustainable way in the first three years.
- FUNDECOR and its co-operators have agreements with more than 80 landowners to establish more than 1,000 hectares of native species plantations.

- FUNDECOR has increased the efficiency of natural forest management and reforestation that has resulted in high timber prices for landowners. Landowners have been helped to increase their incomes from timber harvesting and by establishing native-species plantations on portions of degraded pastures.
- Increased efficiency in reforestation and natural forest management has resulted from initiatives to reduce planting costs and forest management plan costs and to raise timber prices for the landowners.
- New forestry investment and employment has been generated by acting as an intermediate buyer of seed and seedlings, and as a contractor for tree planting and forest management services.
- FUNDECOR reforestation and natural forest management programs include a broad spectrum of socioeconomic groups; but, by emphasizing larger landowners, it is missing the small farmer, who is one of the major causes of natural resource deterioration.
- One of FORESTA's most effective educational techniques has been the promotion of model service contracts that specify how tree planting and harvesting are to be conducted.
- FUNDECOR has introduced several natural forest management practices to landowners and loggers aimed at minimizing the impact of selective harvesting of native species in standing primary and secondary forests and maximizing the profit to the landowner. Damage to forest soils and streams from selective timber harvesting are lower where FUNDECOR-promoted practices have been followed.
- FUNDECOR has acted as an intermediary in the purchase of seed and seedlings and as a contractor for tree planting and management services. Direct investments and employment has been generated in seed collection, nursery seedling production, and reforestation and has increased landowner's incomes from tree planting and harvesting.

FUNDECOR is working with the *Dirección General Forestal* (DGF) to simplify procedures for the preparation and approval of natural forest management plans and, where necessary, with landowners to obtain title to the forested land that they wished to manage.

REFORMA

The Regulations for Forest Management Project (REFORMA) was designed to address some of the problems noted in the BOSCOA project and elsewhere. The documentation provided to the LAC NFM Review Team on this project is limited to what is possibly a draft, and the name of the author or the institution preparing it is not given. From the text, it appears that there were difficulties in the administration of the project by FUNDATEC (also unidentified). The project lasted only a year and a half, with a slow start and an abrupt end as a result of management difficulties. USAID terminated the project early, recommending a bill for collection to FUNDATEC in the amount of \$57,667. Nevertheless, the information presented in the document gives a basis for evaluation.

The goal of REFORMA was to promote the adoption of sustainable forest management practices. Its purpose was to define a policy structure that would encourage the expansion of the forested areas of the country. The rationale for this project was to assist the government to develop a longer-term policy structure, needed to assure that immediate objectives of limiting deforestation are not lost in the future. Its design was based on a general agreement that the government will need to maintain some controls on the rate and nature of forest use. REFORMA focused on the problems in ensuring that the government controls will be effective in promoting the adoption of sustainable forest practices

Assumptions on which project design was based include:

- The prevailing policies, procedures, and current economic, social, and political factors will result in continued deforestation. The remaining forest cover will be incapable of supporting a forest industry. A policy offering forestry incentives is necessary to support combined efforts to control deforestation and to increase the yield of productive forests.
- Integration of different sectors is vital to coordinate resource preservation and management of sustainable commodity production. Integration of the different sectors is essential to coordinate resource preservation and adequate forest management. A coordination group composed of representatives of government agencies, industry, universities, and the workers (sawyers, machine operators, and processors) is needed to exchange information and coordinate forest management and use activities.
- Education and training are necessary in the long term to build a public consensus on the need for forest preservation and management. In the short term, give priority to the prevention and control of illegal and uncontrolled forest practices.

Despite its relatively short duration, REFORMA claims some successes. The project supported SINAC (*Sistema Nacional de Áreas de Conservación*), formerly the General Forestry Directorate, efforts to increase the effectiveness of field enforcement of regulations designed to promote sustainable forest management practices. Three pilot demonstration areas were selected with an inspection station. Adequate staff, material, and logistical support was provided to the three stations. A system for control and enforcement of legal cutting of timber was designed and implemented in the three pilot areas. A computer-maintained database system was developed to correlate cutting permits and the tagging of logs for transport and to track the movement of legally cut timber.

The project invested heavily in the continuing education of judicial officials, SINAC employees, local police, and the public leaders in forestry jurisprudence and the monitoring of court cases involving violations of the forest law. The objective was to create functional deterrents to violation of forestry laws and regulations that compromise efforts to increase the application of sustainable forestry practices. The project promoted the involvement of the NGO community along with the private sector to work with government agencies to achieve a common objective of finding solutions to the current deforestation problems.

REFORMA invested in training that included efforts to:

- Improve the technical skills of sawyers, tractor operators, and technicians supervising forest operations to use sustainable forest management techniques.
- Institute a public information campaign aimed at the media, concerned NGOs, and the public on the nature and need for sustainable forest management practices.
- Provide modest support to the efforts of local NGOs and private sector associations to promote sustainable NFM in three pilot areas.
- Support the appearance of new markets and trade opportunities for sustainably produced tropical forest products from Costa Rica.

The accomplishments of REFORMA include, briefly:

- Developing a clear understanding among government agencies, the industry, and NGOs on what must be done to curtail deforestation and promote sustainable forest management.
- Raising public awareness on the importance of the forests to create a high standard of living for rural people and to increase the return to forest landowners.
- Making known the importance of information exchange and collaboration by all sectors of the country in understanding the current state of the forests of the country and the need to share experience and coordinate efforts to conserve the remaining forest resources of Costa Rica.
- Reconciling differences between forest officials and the members of the legal system on the application of forest laws and regulations and the importance of reducing illegal cutting and forest degradation.
- Helping reach an agreement between the Cámara Costarricense Forestal and forestry agencies on incorporating regulations important to the interests of the forestry sector, including simplified procedures and new programs to move forest management toward sustainability.

The project description and apparent success of the project in its short life merit study in depth. A project that develops three pilot projects with inspection stations is important to evaluate, particularly one that works from the legal system through to training wood workers would seem a clear model for application in the efforts to expand sustainable natural forest management.

3. Issues and Opportunities

A strong and well-financed institution is required to implement natural forest management programs with the continuity of effort needed to be successful. This seems to be the case with FUNDECOR, which is receiving assistance from other donors after the withdrawal of direct USAID support

- Forest management programs require the participation and involvement of government institutions, the judiciary, and enforcement agencies, as well as natural resource agencies, to be effectively supported.
- Local community and landowner support of natural forest management is dependent on economic return in order to be sustained. Financial incentives that provide cash income are essential for small farmers to participate.
- Secure land titles and clear land tenure policies are essential to attract investment in reforestation and in natural forest management.
- Models of contracts for forest services that are supervised in implementation can be an effective vehicle for transferring knowledge, raising awareness, and changing behavior of resource users.
- Monitoring natural forest habitat change and its relationship to reforestation and forest management might better be undertaken entirely apart from the agencies, public and private, responsible for directing and supervising forest operations.
- Empowerment of NGOs and local community associations and cooperatives can be effective in implementing natural forest management and forest plantation projects.
- In choosing these organizations to implement projects, USAID and other donors must balance the benefits of community involvement with issues of administrative ability and financial solvency, particularly when working with newly established environmental NGOs.
- The long-term financial sustainability of FUNDECOR should be assessed to assure that it would be able to continue and expand its ambitious programs. The sensitivity to changes in government incentive programs should be carefully weighed and contingency planning encouraged.
- The three natural forest management programs reviewed here make no reference to certification of forest practices. This may not have been a priority at the time that these projects were designed, but it will be increasingly so in the future.
- Future projects to promote sustainable natural forest management must consider forest product development and marketing, including the use of lesser known species and non-timber products.
- It is recommended that USAID invest in an evaluation of the lasting impacts of BOSCOA, FORESTA, and REFORMA at this time, five years after the termination of these projects, to determine their success in natural forest management.

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Appendix D. Ecuador

1. Forestry Sector Overview

In 1988, 16 million hectares—more than 50 percent—of Ecuador was forested. About 4 million hectares of these were undisturbed primary forest, another 4 million secondary forest with varying degrees of disturbance. The remaining 8 million hectares were a mixture of secondary and primary forests, pastures, and mixed agriculture. About 70 percent of Ecuador's forests are in the Amazon and 30 percent on the coast (DTM Cia. SA and Dames and Moore 1992).

The forestry sector's share of GDP is 1.7 percent, and the total direct employment by the sector is estimated at 200,000 people (Montenegro personal communication). Ecuador has a long tradition as an exporter of hardwood plywood and balsa wood but its trade balance in forestry and wood products has been slightly negative due to heavy imports of pulp, paper, and cardboard.

In 1980 Ecuador's forestry sector exports of wood products accounted for 3.3 percent of the country's total exports, excluding oil and its derivatives. Between 1980 and 1999, exports of Ecuadorian forest and wood products trebled from \$30.4 million to \$94.7 million. About \$30 million of this increase corresponded to the export of plantation roundwood. The policy change authorizing such exports was made around 1993 and is discussed below.

The Destruction of Natural Forests Continues

As the land-poor population from the hilly slopes and fragile soils of the Andean highlands grew, small family plots were subdivided, and the overflow population emigrated to the Amazonian lowlands and the northwest forests. The migration to the Amazon exploded in the 1970s as the oil exploration boom brought indiscriminate building of roads that gave access to the rivers in the upper Amazon tributary network. With migration, forests were cleared for other uses.

Efforts to manage the forests took hold, and, by 1995, 4.1 million hectares had been legally declared protected areas. Outside the protected areas, about 5 million hectares remain as natural production forests. However, these continue to be cleared at a rate estimated by AIMA (*Asociación Ecuatoriana de Industriales de la Madera*) at 140,000 hectares annually, primarily in the Amazon.

During the 1970s and 1980s Reforestation Was Emphasized

About 4 million hectares of forestlands converted to pasture lands and degraded by inadequate agricultural practices are located in the foothills of the coastal range. Some degraded areas also remain in the less accessible valleys of the Sierra and the eastern foothills of the Andes. These have been targeted for reforestation with a mix of native and exotic fast-growing species. Ecuador's administrations have historically tried fiscal plantation incentives but with few results.

Estimates of areas with forest plantations are particularly weak. In 1988 forest plantations were estimated at 66,000 hectares (CENDES and CORMADERA 1991). Analyses of the increase in planting rates of eucalyptus and teak as a result of the new business of roundwood exports are not well known.

Good Chances for Natural Forest Management in Ecuador's Northwest Forests Discovered in the Mid-1990s

The humid tropical forests of the northwest are the most productive in Ecuador, by far. The province of Esmeraldas supplies 55 percent of Ecuador's formal industrial roundwood consumption. The estimated population for the province in 2000 was 417,000 based on 1990 census data by INEC (*Instituto Nacional de Estadística y Censos*). Just over half is rural.

In 1999 Sanchez estimated that, of the total Esmeraldas land area of 1.6 million hectares, 285,576 hectares (21 percent) were classified as natural productive forest. Also, 40 percent (547,000 hectares) was deemed to be remnants of native forests with smaller residual patches of forest that have agroforestry or reforestation potential.

The better-producing forests remaining in Esmeraldas are accessed by rivers and are in the hands of indigenous groups like the Chachis, Cayapas, and communities of African descendants who have lived close to the rivers for several generations. The Chachis claim about 60,000 hectares of natural production forests.

Sande (*Brossimum utile*), a medium-density, light-colored wood that is the backbone of the Ecuadorian plywood industry, frequently comprises half or more of the commercial volume per hectare of the trees over 60 cm dbh. Preliminary estimates of growth rates indicate that the productivity of these forests is high. By the mid-1990s, after having established several thousand hectares of plantations in Esmeraldas Province, the Durini Group, Ecuador's leading forest enterprise, started to explore the potential of managing the vigorous natural regeneration of sande and other preferred plywood species. Interesting forest management agreements backed by technical and social assistance have been established between the Chachi and Durini groups.

Policies

Ecuador's Forest and Protected Area Policies were formalized for the first time in 1995 by the *Instituto Ecuatoriano Forestal y de Áreas Naturales y de Vida Silvestre* (INEFAN), created in September 1992 under the Ministry of Agriculture (MAG) but with its own steering board. INEFAN introduced the concept of using private entities and NGOs to co-manage some of the agency's programs and protected areas.

Before 1995 developments in forestry and protected areas were mostly a by-product of agricultural land expansion and oil exploration, both government priorities. During the 1970s and 1980s forestry agency focus had been on industrial reforestation; it then moved toward agroforestry and expanding the protected areas. Managing natural forests was never emphasized, since plantations offered so much promise and, in many cases, were established under fiscal incentives. This started changing in the mid-1990s as a result of international donor influence and the planters' own experiences and observations of the tremendous growth potential in some natural forests.

The Ley Forestal y de Conservación de Areas Naturales y de Vida Silvestre (No. 74 of 1981) defined the concept of public forestlands—the Patrimonio Forestal del Estado. It assigned the task of demarcating forestlands on the ground to a commission or interagency group that would include the forestry, water, and land-reform agencies. This never happened to any significant extent. Today, it is widely acknowledged that most accessible public lands (even those located a two-day walk from the nearest road or river) have claimants on them. Decades ago, there was a poorly conceived effort to concede use rights over public forestlands to private industries, which failed. That notwithstanding, the government of Ecuador has never seriously considered selling public forest lands to private bidders.

A new forestry law has been under discussion since 1996. Present government policy priorities are to decrease the clearing of forests by making it more costly than managing them, to eliminate illegal timber commerce, and to clarify and regulate land tenure.

Institutions

The single most influential agency affecting Ecuadorian forests during the 1970s and 1980s was the now defunct *Instituto Ecuatoriano de Reforma Agraria y Colonización* (IERAC). This agency demarcated and titled public forestland in 50-hectare plots to land-hungry peasants through a process that lasted five to ten years and required that a percentage of the land be cleared annually as proof that the land was being actively worked. The plywood industry, hungry for sande and virola, invested in good penetration roads and purchased timber from colonos eager to clear their forests. After several years, as the colonos exhausted their resources, and when their lands became titled, they sold them and moved back to the cities with their small capital. The Durini group started buying plots, aggregating them into blocks, and planting fast-growing native species, such as *Cordia alliodora* and *Schyzolobium parahyba*.

The institutional landscape related to forestry and protected areas in Ecuador has changed five times over the last 20 years. Along with IERAC, the water resources agency had overlapping jurisdiction and a voice in how publicly owned forestlands were allocated. The *Instituto Ecuatoriano de Recursos Hidráulicos* (INERHI) is formally in charge of managing key watersheds. Since August 1998 forestry is under the newly created Ministerio del Medio Ambiente.

2. USAID/Ecuador's Investments in Natural Forest Management

The Forestry Sector Development Project (1983–91)

USAID began funding the Forestry Sector Development Project (FSDP) in August 1983. Originally a five-year project, its completion date was extended by amendments through September 1991. As of May 1986 it consisted of a \$6.5-million loan to the government of Ecuador and \$1.6 million in grants. The original project included three major components: Institutional Development of the National Forestry Directorate (DINAF); applied research and field demonstrations, mostly on agroforestry; and protective forest and watershed management. This last component was to assist in the delimitation of national parks and reserves and the *Patrimonio Forestal*, which would have included all publicly owned forestlands.

In subsequent amendments, FSDP began to focus on activities showing more progress, such as Amazon agroforestry, Sierra agroforestry, forest pathology and entomology, work with Indian federations and communities, flora of Ecuador, and research. Disbursement mechanisms hampered project efforts to provide opportunistic support for smaller initiatives of high potential that fell in the same areas of project emphasis but were not executed by DINAF.

Problems. On paper, FSDP had some leeway over the areas that it could support; in practice, DINAF's designation as the mandated counterpart greatly limited the flexibility of what could be done. The final report on the FSDP by Chief of Party José Orellana (1991) states:

Progress towards achieving project objectives had been slow, partly because certain elements of the project purpose, such as the emphasis on reforestation/afforestation, watershed management, and delimitation of natural areas, were inappropriate and partly because of institutional resistance to planning, coordination, and collaboration and to becoming involved in non-traditional forestry activities such as forest management.

Lessons learned. FSDP had DINAF as its designated counterpart and did not include policy or private sector components. Following the USAID's previous pattern of bureaucratic compartmentalization, FSDP lacked strong links with other USAID-funded activities, such as the Agricultural Policy Research unit attached to the Ministry of Agriculture or the centrally funded Forestry Private Enterprise Initiative or the Non-Traditional Export Project. All of these activities had close working relationships with high-level private and public decision-makers in the forestry sector and could have supported policy initiatives and institutional reforms.

Achievements. In fairness to the FSDP, it operated before the time when natural forest management was beginning to be recognized as part of the solution. The major social and political forces behind the agricultural frontier expansion and the political clout of forest industries that benefited from this process favored the status quo.

Nevertheless, the remarkable progress made by the FSDP-supported Flora del Ecuador project in cataloguing the different tree and plant specimens created an important base for future NFM in Ecuador. Another accomplishment of FSDP was the Amazon Agroforestry project, which had very rapid replication rates and demonstrated to DINAF what was needed to execute projects in the field.

The USAID/USDA Forestry Private Enterprise Initiative (FPEI), 1984–90

This project was launched early in President Ronald Reagan's administration as a five-year, \$3.5-million USAID centrally funded initiative seeking ways to spur sustainable, forest-based development by working with the Latin American private sector. This was a research grant, and North Carolina State University (NCSU) was the lead implementing agency in close coordination with the USDA Forest Service and Duke University.

During the mid-1980s, more than 90 percent of the timber felled in the Ecuadorian Amazon was burnt in place by colonization, with strong support from the political, social, and oil exploration forces. FPEI's aimed to demonstrate that forests could be permanent sources of income and employment and, therefore, had value and were worth conserving. The FPEI set out to help enlightened private firms and producer associations in the timber industry to create more value

from forest harvests, expand their markets, lengthen their planning horizons, and engage policymakers to reduce slash-and-burn practices and pay more attention to the forest sector. FPEI also tried other options, such as supporting nature tourism, to encourage recognition of the value of Amazonian natural forests in the eyes of local policymakers.

Perhaps because of FPEI's nature as an applied research grant, its implementation offered considerable flexibility. As a result, the Project was able to work opportunistically with all actors and all issues in the forest-to-market chain for timber products, bamboo, and nature-oriented tourism. Initial activities covered a purposefully wide range to identify promising local partners. These included product development, buyers' and sellers' tours, price bulletins, applied economic research, market studies, demonstration housing prototypes, in-plant assistance, cost and yield studies, industry surveys, and policy analysis. The private sector office provided USAID/Ecuador's oversight of the project, and informal links were maintained with the FSDP project and with the USAID groups involved with housing.

Achievements. Although most of the above activities have little direct bearing on NFM, they have collectively increased the visibility of forests and the industrial forestry sector as a sustainable source of jobs and foreign exchange. After four years, the FPEI left two locally managed initiatives funded by PL-480 funds.

One of these PL-480-funded activities was a project implemented for about two years by a national tour operators association, the *Federación Ecuatoriana de Promoción Turística* (FEPROTUR). It continued FPEI studies and promotion in support of nature-oriented tourism in the Amazon region of Ecuador. The applied research papers produced by NCSU and Duke University served as analytical guideposts to further developments in the field and to improve its contributions to forest conservation. Today, the Ecuadorian Amazon is a well-recognized international destination for nature lovers and students.

A major policy achievement by USAID. FPEI had a major, yet unexpected, policy impact. Regulations prevented exports of eucalyptus plantation roundwood and chips, creating a lack of competition that caused domestic stumpage prices to be negative for plantation timber and discouraged planting without heavy subsidies. Starting in 1989, FPEI conducted the first policy studies on the subject and argued the case with AIMA's larger members. After FPEI left Ecuador in late 1990, Fundación Idea, a USAID-supported agricultural policy think tank, continued this policy dialogue with industry until the exports of roundwood from plantations were allowed, in about 1993. Only seven years later, after significant private foreign investments in new, deep-port loading facilities in Esmeraldas and in new plantations, Ecuador's annual exports have increased by over \$30 million. This represents several thousand new jobs in rural farm properties all over the Sierra as far south as Cuenca.

Lessons learned. Achieving synergies among all in-country activities of an agency and among agencies in a given sector, including those that are highly specialized or autonomous, requires good coordination from the top down. This coordination is especially important when dealing with policy reforms in difficult topics that require sustained action over long periods or decisive, high-level support at certain junctures.

Lessons that can be learned from the CORMADERA problems. The second activity left behind by FPEI and funded by PL-480 involved the consolidation of the *Corporación de Desarrollo para el Sector Forestal y Maderero* (CORMADERA). This non-profit corporation was spawned by FPEI to provide internationally re-certified quality control services for a fee to the larger exporters, as well as technical assistance and applied research to all forest industries.

Failure to obtain the collaboration of the Ministry of Agriculture to allow the use of their abandoned wood research laboratory facilities at Conocoto started the troubles for CORMADERA. Later, a poor selection of the first CEO and a weak follow-up by FPEI, AIMA, and USAID resulted in CORMADERA deviating from its original mission and losing support from its constituents. The entity has now been revived by AIMA as a think tank and to execute projects for the forest sector.

In hindsight, the CORMADERA failures tell us that there should have been more and earlier cooperative efforts with the public forestry organization. This might have enabled CORMADERA to revive the decaying, wood-research laboratories at Conocoto, now irretrievably lost.

Projects that intend to work in policy or wish to spawn effective national institutions need to establish early contacts and gain credibility with all relevant private and public actors. They must have continuous and active support of high-level officers. The best proof of commitment of local beneficiaries behind a project is to require that they invest something with real value to them, not just their time. Forcing too many diverse partners into a project runs the risk of diluting the interest of key players.

The SUBIR Project

The Sustainable Uses of Biological Resources (SUBIR) Project (ECU040) aims to promote conservation of biodiversity through local participation in the development and management of natural resources. The project operates in and around the Cotacachi-Cayapas Ecological Reserve in northwest Ecuador and in the Ethnic Huaorani Territory Reserve in the Napo and Pastaza provinces, close to the Yasuni National Park.

This project worked initially on consolidating parks and protected areas in the Oriente and the Cotacachi-Cayapas areas, with a heavy orientation toward scientific research. After establishing the protected areas, SUBIR focused its work on the northwest lowlands, specifically with about 25 communities living around the Cotacachi-Cayapas Ecological Reserve so their economic survival can be based on sustainable management of resources outside the reserve.

Now in its third phase of implementation, the project seeks to increase the capacity of households and communities to manage their natural resources and to carry out conservation activities that are economically, socially, and ecologically sustainable, such as small-scale commercial forestry, carpentry, ecotourism, and participatory biological monitoring.

CARE/Ecuador implements the SUBIR Project through agreements with local NGO partners (EcoCiencia, Jatun Sacha) and with technical assistance from Wildlife Conservation Society. In the Provinces of Esmeraldas and Imbabura, the project benefits 3,000 families in 70 communities and two Ecuadorian NGOs.

Components of SUBIR as of December 2000 include:

- Institutional strengthening and organizational development
- Policy and legal issues
- Improved land use (Fundación Jatún Sacha)
- Marketing (CARE)
- Biodiversity monitoring (Ecociencia)

The project works with native Chachi communities and Afro-Ecuadorians, who settled on the reverie areas many generations ago and have historically depended on selling timber. Originally, they sold large construction timbers of chanul (*Humiriastrum procerum, L.*) and other durable species, now gone. Today they sell sande logs to plywood companies, smaller timbers, and chainsawn fitches. These groups of communities are organized into communes that hold collective land titles and select their local leaders annually. As a prerequisite to natural forest management, CARE and its NGO partners have assisted the leaders of the communes in the formation of committees to address different issues, regulations, accounting, and profit distribution of community-owned resources, such as timber of community enterprises.

Fundación Ecociencia, in partnership with the community at Playa de Oro and with a private tour operator, is in the early stages of an ecotourism venture, which has begun to generate substantial revenues for the community. The establishment of a trust fund to provide continuing support to developmental activities after the SUBIR project ends is being discussed. Other important income diversification efforts include improved agronomic practices for basic crops, such as cacao and plantains; improved management of domestic animals; and the inter-planting of Laurel (*Cordia alliodora*) and Cedro (*Cedrela odorata*), both fast-growing trees with good regional markets. The project is also exploring opportunities for developing cash crops of Panama hat palm, various tree fruits, and medicinal plants.

Achievements in Biodiversity Conservation. The consolidation of Cotacachi–Cayapas and other parks is an achievement in itself, given the accessibility problems. As for the work in the park buffer zones, a September 2000 survey by Ecociencia shows that the annual rate of deforestation from 1998 to 2000 in the areas influenced by SUBIR is 0.25 percent compared to 0.5 percent outside this area. Both are considerably lower than the respective values of 2.7 percent and 1.8 percent measured during 1993–98.

Achievements in Forest Management. Although forest management and timber production were not part of the original project, the basic training and organization for hands-on forest management provided to communities around the San Miguel area of the Cayapas River is impressive. In particular, the training and use of community members as para-technicians in areas such as tree identification or formalizing land titles legalizing boundaries seems to be a resounding success. Clearly, the para-technicians' intimate knowledge of the forests and their people cannot be matched by outsiders. The concept of using local paralegals to help clarify land

tenure issues has been expanded to other USAID activities, and the World Bank is now supporting the work of over 160 throughout Ecuador.

Problems and lessons learned. The SUBIR technical team chose the path of public confrontation and TV debates to try to force the plywood companies to pay a higher stumpage price for the timber they purchase. The communities and the plywood companies will be there long after the SUBIR project leaves. Any exit strategy for SUBIR should be compatible with the market in which the communities must operate and their present and short-term possibilities and limitations.

Availability of margin to pay for stumpage prices is a residual value that depends on a range of factors including changing market prices, processing costs and yields, logging costs, infrastructure investments, corporate policies, and subsidies, among others. Until there are alternative, higher-value uses and real market bids for comparable quantities of the same logs, it is self-defeating to force temporarily artificial prices based on theoretical studies. Sande logs are very susceptible to insect and fungi attacks—that alone limits the validity of most economists' assumptions about shipping sande logs overseas at internationally published prices.

Opportunities exist to pursue value-added manufacturing of higher-valued millwork products in ways that bring higher benefits to the communities than just selling logs for plywood. This would be particularly suitable for logs of species and qualities not suitable for peeling or slicing. Communities and NGOs are now considering new strategies that include appropriate alliances between community groups and partners who are experienced in the business.

Lesson in the making. NGOs, by nature, have difficulty coming up with exit strategies for themselves. Further, they are not the most likely vehicles for developing the business capacity of communities. The less formal education these groups have, the more they need experienced assistance to explain essential concepts in simple ways tailored to their needs, interests, and limitations.

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Appendix E. Guatemala

Through 1996, Guatemala had suffered from 36 years of political repression and armed conflict. In part, the origins of this violence were natural resource-based—the extreme inequalities in land ownership and income between the rural, largely indigenous population and urban dwellers. The country's recovery from 20 years of civil war has been slow, and conflicts have continued even after peace accords were signed in December 1996. While some of the social and economic tensions that caused the violence remain, progress toward a more open democratic political process is being achieved. However, additional social pressures can be anticipated from the 3 percent population growth rate and the lack of economic opportunity for a large segment of the country's population, which is expected to double to about 20 million by 2015.

Most Guatemalans live in the highland valleys. These areas have reached or exceeded the limit of what they can absorb, and migration to the unoccupied tropical forests of the lowlands is inevitable. Over 40 percent of the land, best used in forest, has been deforested and converted to other uses by the expansion of agriculture, harvest of fuelwood, and logging. The deforestation of the uplands has severely altered the hydrology of the watersheds and accelerated soil erosion. Increased population combined with degradation of the uplands is forcing migration into the unpopulated forests of the Petén accompanied by deforestation for agriculture following the logging of mahogany and cedar.

USAID/Guatemala's natural resource management and conservation program supports national efforts to halt deforestation by stabilizing the agricultural frontier, conserving the Maya Biosphere Reserve (MBR), and promoting sustainable development based on tourism, forestry, and other income alternatives. Its assistance has contributed to the reduction of deforestation rates in the MBR with 48 communities now participating in natural forest management in and around the reserve. About 2,800 families have received assistance in securing land titles, and 51 percent of them have adopted some of the conservation practices promoted by the international and local NGO partners of USAID.

1. Forestry Sector Overview

In 1997, the forests of Guatemala were estimated by FAO to have an area of 3,176,200 hectares, of which 80 percent was broadleaf species and 20 percent conifers, mangroves, and mixed regeneration. Fifty-eight percent of this forest is located in the Petén, which is the principle source of raw material for the forest industry. The national rate of deforestation was conservatively estimated at 82,000 hectares per year by FAO in 1997. Annual wood consumption is around 13.6 million cubic meters, of which 86 percent is used for fuelwood and 7.5 percent converted to charcoal. Only 5.5 percent is used by the forest industry. In addition to this wood consumption, deforestation from the advance of the agricultural frontier is estimated to destroy 11 million cubic meters annually.

Incentives are available to promote reforestation throughout the country, with an estimated rate of newly established plantations increasing to 15,000 hectares per year. Many of these

plantations would be established for fuelwood and on-farm uses in the highlands and for soil conservation purposes. In addition, an industrial forest plantation program is essential for Guatemala to reverse its unfavorable trade balance in wood products. The value of imported wood products in 1997 was \$81 million compared with \$22.5 million in export sales. The deficit in pulp and paper was even worse at \$122 million. The forest industry contributes only 2.6 percent to the GNP of the country and represents 12 percent of the agricultural sector.

Guatemala's forests are the property of the state, yet there is a lack of government control over forested areas. Poor enforcement of existing laws has left the forests open to exploitation. The issues of the forest use are also heavily influenced by the social and environmental impacts of war, poverty, and population pressures. Problems of corruption and low standards of logging pose unique challenges to community forestry initiatives in the country. There is heavy pressure from colonization, industrial logging, cattle ranching, and petroleum explorations, with many of these activities occurring illegally. Estimates suggest that for every cubic meter of timber (cedar or mahogany) in the region taken legally, three meters of timber are taken illegally.

Natural Resource Policy and Governance

Four government institutions have responsibilities concerned with natural resources and the environment and influencing forest management. The National Environmental Commission (CONAMA), responsible for environmental policy, granting of use permits, licensing, and enforcement of sanctions, focuses on the water and atmospheric contamination, clean energy sources, and solid and liquid waste disposal. The Ministry of Agriculture, Livestock, and Food (MAGA) establishes and implements policies dealing with the agrarian sector, sustainable use of natural resources, and hydrobiology. It is also responsible for land-use policies, natural resource use, plant and animal disease control, and food security. The National Forest Institute (INAB) oversees development, coordination, and implementation of the national forest policy. INAB manages the national forests outside the Guatemala National System of Protected Areas (SIGAP), promotes forest plantations through an incentive program, and promotes the forest products industry processing of primary and secondary forest products. The Protected Areas National Council (CONAP) administers all productive and conservation activities in SIGAP and the national management of biological diversity and wildlife.

Maya Biosphere Reserve

The Petén, the largest area of intact tropical forest in Central America, is one of the last remaining frontier forests in the Americas. CONAP is responsible for the management of the Maya Biosphere Reserve as a part of the SIGAP. MBR has an area of 1.5 million hectares consisting of "nuclear zones" designated for complete protection and 800,000 hectares designated as a Multiple Use Zone (ZUM) that can be managed for the production of timber and other forest products. Both the nuclear zone and the ZUM are property of the government of Guatemala and private ownership is not permitted. Since 1994, the National Council on Protected Areas (CONAP) has implemented a program of allocating concessions to neighboring community groups and to forest industry and concession agreements. As of September 2000, 12 community concessions had been awarded, totaling 400,000 hectares. Seven of these concessions are certified or in the process of obtaining certification. Two industrial concessions of 132,000 hectares are recognized in the ZUM. Five cooperative concessions are located in the buffer area

of the MBR, with three of them candidates for certification. In addition, CONAP oversees the management of 24,000 hectares of privately owned parcels in the buffer areas.

The MBR program has been successful in maintaining the forest cover in the reserve. Forest mapping shows almost no change in the areas of the community concessions since 1995. In comparison, increasing deforestation has been seen in the nuclear zones and buffer areas. The contracts awarding communities and cooperatives stewardship of their concession has empowered them to defend their boundaries against squatters or illegal logging. The communities also effectively control fire on their concessions. Fire burned 22 percent of the nuclear zone and 33 percent of the buffer zone in 2000's fire season, compared with only 3 percent in the forest concession area. The potential social benefits of the concession program are also impressive. Use of wood and other forest products is generating employment and community income. It also has the benefit of developing organizational and administrative skills in the community, which gains a growing sense of identity and confidence in the ability to manage its affairs.

The Future for Community Concessions

While the initial report on the community concessions in the MBR is hopeful, some issues should be considered when looking to the future. One question is the long-term sustainability of forest management by the communities. Only four of the 22 concessions have been operating for more than four seasons, and eight others have only had one year of experience. While some communities work without major advisory assistance, most still depend on technical advice on management, logging practices, and marketing. International environmental groups, such as Conservation International, The Nature Conservancy, CATIE, and others, have USAID funding to advise the concessions on organization and management issues, and have provided help on marketing timber and non-timber products.

These NGOs have raised private funds to match USAID and government funding and have taken the initiative to promote the community forest concession program. These groups were concerned with reducing the spread of clearing for agriculture as uncontrolled logging threatened the forests of the Petén. For example, in 1997, the community of Carmelita received 53,000 hectares, one of the largest community concessions, to manage for timber and collection of other forest products. Threats to this community's resources include encroaching settlers—returning refugees from past political violence were being settled in the forest and encountering conflict with long-term residents—and ranchers from the south and illegal loggers from the north. Continued advisory support on organizational issues and the market of concession products will be needed for the immediate future to give Carmelita the strength to resist the pressures on its resource.

Factors that will affect sustainability of forest management on community concessions include varying sizes of the concession or cooperative forest, the quality of the forest resource and volume of high-value species, and developing markets for lesser known species and minor forest products. Community management capacity and the costs of taxes, fees, and bureaucratic inefficiencies also play an important role. CONAP and the concession holders depend on continuing technical assistance to find solutions to these issues. Continued advice by the international conservation organizations is needed to capitalize on the initial success of the MBR

concession program and to increase the profitability of the communities while achieving overall forest conservation objectives.

2. USAID/Guatemala's Investments in Natural Forest Management

USAID's priority in Guatemala is to support the peace accords and national efforts at reconciliation. This includes fostering initiatives to improve democratic processes and local governance; assisting small farmers and businesses to increase rural income and food security; and opening the access of the rural poor to land, credit, and productive resources. These actions all contribute to achieving USAID's Environmental Strategic Objective of "Improved natural resource management and conservation of biodiversity." The Maya Biosphere Project is the flagship of that effort.

In August 1990 the government of Guatemala and USAID signed an agreement to support the Maya Biosphere Reserve (MBR). This initiative's goal is to improve the long-term economic well-being of Guatemala's population through the rational management of its renewable natural resources—specifically, improving management and protection of the biological diversity of the tropical forests of the MBR. The project components include management of the reserve, environmental education, and development of economic activities that use the tropical resources of the reserve in a sustainable fashion. CONAP, The Nature Conservancy, Conservation International, and national NGOs implement the project. Project funds included \$10.5 million from USAID and \$11.9 million from the Guatemalan government and international NGOs.

A midpoint evaluation of the MBR project reached the opinion that, while the project had a coherent design, it addressed environmental projects "at the margin rather than head on" (MacFarland et al. 1994). It suggested that the project treated social, economic, and political issues in the Petén as externalities, not as project components. At the same time, the evaluation noted that major social phenomena arising out of the peace accords was not explicitly addressed: migration from the south, refugees from the north, lack of land tenure or other usufruct security, a climate of violence, corruption, and a lack of law enforcement. The evaluation also noted the ineffectiveness of attempts to apply strict protectionism control measures to the whole reserve, as opposed to gradual consolidation combined with educational programs. CONAP was judged as unable to fulfill effectively its responsibilities to coordinate, plan, and implement MBR management or to manage its resources and personnel.

Since that evaluation, the MBR project has been strengthened by political changes in the country: the signing of the peace accords in 1996 and resulting efforts to find land for refugees returning to Guatemala. In lands bordering the MBR, more than 300,000 hectares have been designated for sustainable agroforestry development. These areas will be managed and benefit the local communities and complement the community concession program in the multiple-use zones within the MBR. Further support of the MBR work of CONAP comes from USAID's implementation of the Central America Protected Areas System (CAPAS) project.

CAPAS implements four actions: efficient environmental management, increased protected areas management; assistance to local communities to manage coastal and forest resources; and strengthened enforcement of regional environmental regulations. USAID is helping promote the establishment and protection of the Mesoamerican Biodiversity Corridor of natural forest from

Panama to Mexico. Activities include the establishment and support of new protected areas with under-represented ecological values in existing reserves; application of criteria and indicators for monitoring protected areas management; and developing strategies to increase the funding for protected area management.

3. Issues and Opportunities

Communities Can Manage Forests

The forests in the MBR's multiple-use area remains intact because of concession holders' efforts to control invading settlers, halt illegal logging, and reduce uncontrolled burning of the forest. The Tschinkel and Nittler survey (September 2000) suggests that the success in forest management to date can create major impacts in the Petén. More than 600,000 hectares of natural forest will be conserved and kept from destructive land uses. Further, once the concessions are in production, 60,000 days of rural employment will be created, providing wages to workers, income to communities. Processing the forest products will generate additional employment in the Petén and increase the fees and tax income to CONAP, as well as revenue to other agencies.

While the future holds promise, CONAP and the forest communities recognize that the system is threatened by economic and social factors beyond their control and that technical constraints must be overcome. Continued support of the MBR management program of CONAP by USAID and other donors is needed to increase the sustainability of community forestry management.

Concession Forest Management and Administration

Most of the MBR communities are newly formed economic enterprises responsible for resource management decisions, but some, such as the Carmelita, existed before 1970. At that time, the community economic activities were based on the work of individuals collecting xaté, pimienta, and chicle. Timber production requires community organization and administration, bookkeeping, cash management, and payroll administration. Sales contracts have to be negotiated with timber buyers and fees paid to CONAP and other agencies. Communities have not yet developed these new skills. An added issue is the possibility of dishonesty or misuse of concession income that will put community cohesion and credibility at risk.

Community financial management should meet minimum accounting standards and have annual audits. CONAP should consider making this a requirement of the concession agreements and arrange for training concession personnel in budgeting and cash management processes. Standardized procedures for the sale of concession products should be public information, with the community informed on the terms of all sales agreements with industry.

Community Organization and Relationships

Often, MBR communities, recently formed themselves, now have the task of assimilating recent arrivals who have migrated to the Petén. Separate from the issues of managing the forest operations, needs frequently arise for community organizational development training and assistance. Installing the appropriate procedures for community governance is essential for avoiding mistrust and corruption. Open election of community leaders, a junta, or governing

board, combined with a transparency in all activities of the administration, can unite the community and enable it to undertake new initiatives. CONAP should facilitate assistance to communities in developing a formal agreement on the rules or procedures for the election of officers, deciding on programs and priorities, managing finances, and being accountable for performance.

Develop Community Self-Reliance

The work of the international NGOs is widely recognized as making a significant contribution to forest resource management and community social development in the MBR. An issue is the community dependence on this assistance from NGOs and their ability to access CONAP and USAID and their additional sources of income. Further, individuals NGOs do not have all the skills or experience in organizational matters or in technical forestry management and use needed by the communities. Competition and rivalry among the NGOs has been recognized at times, and knowledge and lessons learned are not shared.

CONAP should advise the communities to plan for the end of the free advice that the international NGOs have provided over the last four years. A first step in this weaning process would be for the NGOs to begin to charge a fee for their advisory services to the community. Likewise the community should contract for the services from the source that they feel can best supply the assistance it needs. CONAP and USAID should encourage the NGOs to transfer the lessons learned to local Guatemalan partners or consultants who can continue to advise the communities in the future.

Promote Community Collaboration

MBR communities do not exchange information or work together effectively on common issues—rivalry between supporting NGOs may be a reason that cooperation has not developed. The activities of all communities would be strengthened by sharing experience and problems and by working together in representing their interest to CONAP and other agencies. They all share a similar forest resource, produce a similar product, and have common utilization and marketing issues. Also, strong economic reasons exist for promoting collaboration. Cooperation in developing a market for smaller volumes and little known species could increase the income for the concessions.

CONAP with CATIE or other regional agency should support the development of a mechanism for coordination and collaboration among all holders of forest concessions. Experience sharing reportedly has begun through ACOFOP (*Asociación de Comunidades Forestales del Petén*) for the exchange of information. Strengthening ACOFOP or a similar group could benefit all forest concessionaires in their relations with government agencies and with buyers of forest products.

Community Relations with Industry

Conserve the resource base requires increased revenue from forest management. Communities must learn to deal effectively with timber buyers and the forest industry if they are to receive full value for their product. A buyer will contract to buy logs or lumber from the community, and the community may log the timber or contract for the extraction and processing. Industry often will pay an advance to the community for working capital. Tschinkel and Nittler (2000) describe a

second type of sales agreement where the community and the buyer share in the costs and benefits of logging and sales. Disputes have arisen in many cases, particularly in the shared-cost-and-return contract where costs have been inflated and agreements on stumpage costs violated.

A program to improve the negotiation and contract management skills of the community or their representatives is needed. Several models of forest use contracts are available from the FAO, USAID, and other sources. These manuals could be adapted to MBR requirements and used in training community managers and other landowners. CONAP should encourage the practice of competitive timber sales using sealed bids or public auction. Long-term contracts with adequate performance safeguards should be promoted as a means to encourage an operator to use reduced-impact logging practices and to invest in secondary processing.

Certification Research Requirements

More than 100,000 hectares of community-managed forest concessions have been or soon will be certified in the MBR, and a goal of certifying all concessions has been set. Certification requirements appear to be overly stringent in some cases. For example, the certification of the Sayaxché Ejido Municipal requires a plan for “silvicultural practices to restore commercial volumes of species with priority for mahogany, and the preparation of growth projections 41 years forward to assure viable populations of commercial species in the future.” While research in Guatemala and neighboring Belize can guide the mahogany silvicultural plan, the growth projections will require highly technical research. These costs cannot be borne by one concession alone.

CONAP, with the assistance of CATIE, should develop a growth research program for the MBR that would locate sample plots throughout the reserve. The plots should be carefully installed, re-measured systematically, and the data correctly analyzed and interpreted. The results would be used to amend the forest management plans of all concessions in the MBR. USAID should support INAB in financing this applied research.

CONAP Forest Management

The MBR community forest concession program was developed to maintain the forest cover of the reserve against illegal logging and clearing for agriculture. The program responded to recognition that CONAP did not have the capacity to administer the multiple-use zones. Entrusting local communities with management of resources from which they benefit has strengthened protection of the forest and advantageously provides the community with the sense of secure access to the resource in the future. However, the future success of MBR concessions and cooperatives is far from assured. The completion of the USAID project for the MBR will reduce services that international NGOs can provide to the communities in the coming months. It is doubtful that CONAP will be able to assume the service role of the NGOs, nor should it. Further, the communities will not have reached a position where they can contract for the services.

Tschinkel and Nittler (2000) noted an increase in the bureaucratic requirements of CONAP and other agencies. Management plan approval, concession monitoring, evaluations, and certification inspections are too bureaucratic, redundant, and expensive in both real costs and transaction

costs. The concessions report receiving repeated inspection visits by CONAP, INAB, the certifying organization, and USAID contractors. New and increasingly complex reporting requirements and controls seem onerous and unjustified. The various agencies should reach an agreement on sharing their monitoring responsibilities and inspection visits.

Increasing Forest Use Income

Forest communities and cooperatives depend on income from their forest concessions. Increased income can come from three sources: cost efficiencies in timber harvesting and transport to the mill, waste reduction in wood utilization, and market development for lesser known species and other forest products. It also requires capital for and community members assuming a larger role in the harvest and industrialization of the concession. One issue lies in where community members can acquire the skills and equipment to apply reduced-impact logging practices in the forest and increase the recovery and value of wood products from the mill. Technical advice on production and marketing is needed to increase income from natural forest management, as is financing for improvements in equipment. CONAP and international NGOs cannot be expected to have the experience necessary to advise logging supervisors, sawmill managers, or wood product sales personnel.

A follow-on project by USAID/Guatemala is needed to capitalize on the MBR community and cooperative concession program of CONAP. The project should also work with landowners and the industry through the Petén. Needed advisory assistance includes a forest engineer experienced in RIL practices, a milling and wood processing specialist, and a business management specialist. The project should also provide for specialized, short-term assistance in developing a market for lesser-known species and in specialized skills. The national host organization for the project should be an industry association or marketing cooperative rather than a government agency.

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Appendix F. Honduras

Anyone familiar with forestry in the developing world would agree that Honduras is, and has been for some time, the quintessential forestry country. It was an early source of precious hardwoods, like mahogany and Spanish cedar, exported to the United States and Europe in the early 1900s. Similarly, its abundant pine forest resources, made up primarily of *Pinus oocarpa* (pino ocote) and *Pinus caribaea* (pino costanera) became so common on the international marketplace that they were routinely called Honduras Yellow Pine.

Although the country possesses significant lowland hardwood forests, the potential of the large area of pine forests attracted international development assistance early on. As early as 1951 the government of Honduras solicited technical assistance from the United Nations system and other donors for forestry development initiatives mainly concerned with the pine resources. In 1960 the FAO Forestry Department, with funding from what would become the UN Development Program (UNDP), began the landmark Reconnaissance Inventory of the Pine Forests of Honduras project to assess the development potential and needs of this important resource.

In the mid-1960s USAID assigned a Forestry Advisor to the country to help it cope with a massive cyclical outbreak of pine bark beetles. Similar assistance from FAO began in 1963, including inventory and studies of the affected area; possible timber utilization opportunities for the trees killed by the beetle (one study considered the possibility of using the wood for the production and sale of prefabricated wood houses to counter the housing shortage among the poor segments of society); and an analysis of forest management options to maintain more vigorous pine stands resilient to bark beetles. The Honduras-Canada Forestry Program (1977–84), managed by the Canadian International Development Agency (CIDA), also focused on the pine forest resource base. It carried out an extensive inventory of these forests, established a forest fire protection system, upgraded the quality of forest products, and strengthened the national forestry institution.

Later, additional assistance from FAO helped to establish the National Forestry School (ESNACIFOR) at Siguatepeque, which continues as one of the premier regional forestry training institutions in Latin America. Many of the school's graduates went on to complete their professional education as forest engineers under a long-term relationship with Stephen Austin University in Texas or at other U.S. institutions, with support from USAID and other donors.

Both international agencies (FAO and the Inter-American Development Bank) and private sector entities (Crown Zellerbach) studied the possibilities of large-scale development of the Honduran pine forests for the production of pulp and paper. The largest of these proposals was the CORFINO Wood Industry Complex intended to use the extensive pine forests in Olancho as the basis for a fully integrated wood industry, including plywood, particle board, sawn wood, and pulp and paper. Although the paper industry did not materialize, the economy of the Olancho region continues to be dominated by the wood industries.

In 1974 the government established the Honduran Forestry Development Corporation (COHDEFOR), which would enjoy worldwide renown because of its innovative programs linking the forests and their management to the industry and markets and its early efforts at social forestry. It was against this backdrop of what seemed like an improving institutional framework for forestry development that USAID began a long-term involvement with the development of the forest sector that came together in 1980s as the Forestry Development Project (522-0246)—the major subject for this review.

1. Forestry Sector Overview

Honduras is the second largest country in Central America, with a total area of 11.2 million hectares. A good portion of the country is still forested; recent estimates suggest that there are approximately 2.4 million hectares of broadleaf forests and 3.2 million hectares of upland pines (Warren 1996). Appropriate land-use choices are still a serious issue in Honduras, and studies suggest that as much as 40 percent of the land under agriculture and grazing is inherently unsuited to these purposes (COHDEFOR 1994). Traditional subsistence farming, hillside farming, and livestock rearing continue to cause significant degradation of the watersheds throughout the country. Much of the damage wrought by Hurricane Mitch in 1999 is thought to have been exacerbated by the widespread destruction of forest and vegetative cover brought about by land clearing and overgrazing on steep areas unsuited to these practices. Likewise, a hunger for land is now leading to spontaneous colonization of lowland hardwood forest areas—an estimated 2.5 percent of these old-growth tropical forests are now annually being cut over, burned, and converted to agriculture (CIDA 2001).

Any review of natural forest management experience in Honduras or elsewhere must analyze it in the context of the overall constraints and opportunities of the forestry and natural resources sector at the time. In the early 1980s, as the USAID-funded Forestry Development Project was being designed, a number of issues were eroding the potential for using the country's extensive pine resources for development. They included:

- The need for the development of an improved enabling policy and sector strategy environment for sustainable natural resources management to overcome perceived problems such as “gross sector inefficiencies, market failures, skewed resource allocation, failure to exact anywhere near the real price for timber resources, a confusing hierarchy of law and regulation, and ample opportunities for collusion and corruption” (Warren 1996).
- A continuing need to address both institutional capabilities and structural adjustment related to the role of the state forestry enterprise (COHDEFOR).
- A lack of land titling and tenure insecurity that undermined the willingness to make longer-term forest management investments.
- Continuing development of effective forest management technologies and training local staff in their application.

It was against this backdrop of challenges—and real opportunities, given the scope of the country’s forest resources—that USAID began to muster additional concerted support for the forestry and natural resource sector in Honduras.

2. USAID/Honduras’ Investments in Natural Forest Management

Although the Forestry Development Project would only come on line in 1987 after several unsuccessful attempts to come to an understanding with the government about its central premises, many of the other natural resource initiatives by USAID were making headway as a result of the establishment of a more coherent sector program under the mission’s new Office of Environment and Technology during 1976–80. A series of projects beginning in the early 1980s was put in place to address the issues of inappropriate subsistence farming practices on hillside areas, including the National Cadastre Program; the Small Farmer Titling Project; the Rural Technologies Project; the Natural Resources Management Project; and their successor, which continues today, the Land Use Productivity Enhancement Project begun in 1989.

Several other noteworthy assistance initiatives with a broader scope took place in the 1980s. These included the funding of the region’s first national environmental profile (the 1981 Honduras Host Country Environmental Profile) and the Environmental Education Operational Program Grant, using P.L. 480 resources, to support the continuing development of an independent environmental NGO capacity and for awareness building of the importance of environment issues to develop a national sector constituency.

By the beginning of the 1990s, USAID/Honduras’ role in the natural resource sector would take on a purposeful and “fully strategic orientation” (Warren 1996). USAID established “Effective Stewardship of Key Natural Resources for Sustainable Economic Growth” as its Strategic Objective (SO) No. 2. Three key areas were chosen to concentrate the resources available under the SO: pine forest management, sustainable and more productive hillside agriculture, and protected areas and biodiversity. From 1976 to 1995, estimated total funding from USAID for these activities was \$30 million, equivalent in local currency generations from P.L. 480, and approximately \$48 million in loans and grants under D.A. funding. Of these amounts, 29 percent, or \$22.5 million, was targeted at forest management over that period.

Warren’s program level review (1996) and a more project-explicit study (Greulich and Schreuder 1996) provide considerable detail about the activities and accomplishments of the Forestry Development Project. Some of the most salient highlights include:

- With the support of the project and as part of the requirements of the 1994 Agricultural Modernization Law (itself also a USAID policy initiative), COHDEFOR divested itself of the state-owned wood products industries and export business, leaving these roles to the private sector.
- COHDEFOR was thus able to concentrate its activities on promoting and fostering a more cohesive approach to sustained yield management in the pine forests through the establishment of a series of pilot forest management units (600,000 hectares, or roughly a quarter of the pine forest resource base).

- Similarly, the stumpage valuation and timber sale system was completely overhauled, leading to a series of positive results: increased extraction efficiency driven by real values for timber purchased; a switch to timber auctions aimed at transparent sales of state forest resources for buyers; and an improved revenue stream for government—all of which underpin the conviction that rational management of the pine forests makes sense for all concerned.

Despite these considerable accomplishments, USAID/Honduras was forced in 1999 to terminate its support for the forest management activities under FDP. This unfortunate situation was the result of continuing political interference in the operations of COHDEFOR and its procedures for the sale of timber resources. The remaining resources of the project have been re-earmarked for assistance to the National Forestry Training School (ESNACIFOR) at Siguatepeque for training in the area of watershed management.

3. Issues and Opportunities

Staying the Course Makes Sense

USAID's 14-plus-year record of assistance and commitment to the forestry sector, in particular sustainable forestry management in the pine forests, has laid a foundation for natural forest management in Honduras. Despite recent setbacks, the country has probably made more tangible progress toward sustainable forest management—at least in pine forest management and certainly as concerns the training of a cadre of well-qualified forestry staff—than have other countries of the region.

Program Synergy

The USAID-funded Forestry Development Project achieved significant results in terms of the changes to the overall mandate of the state forestry institution, COHDEFOR. Although they were part of the original project design, these results were further reinforced as part of a general agricultural sector restructuring effort (Agricultural Modernization Law) also supported by the mission—a good example of synergy between policy dialogue and reform and a more conventional technical assistance project. Project efforts and advice led to a series of actions designed to enhance the conditions for sustainable forest management. These included fundamental changes in the marketing of standing timber to a public auction system, thereby creating incentives for wiser use of the timber; returning ownership of the forests to private and community landowners; eliminating the government monopoly for forest product marketing and export and opening the sector to the free market system; and encouraging the divestiture of inefficient COHDEFOR-owned processing industries.

Improved Documentation of Sector Development Efforts

USAID at one time appeared ambivalent about supporting productive forest management versus biodiversity conservation—a contradiction in itself. This may still affect USAID programming. Building an understanding and documenting lessons learned is required for USAID and its partners to sustain these necessarily longer-term efforts in natural resource management assistance in the future. A well-illustrated booklet, such as the one done by USAID/Guatemala

about the Maya Biosphere Reserve, should be prepared by USAID and COHDEFOR. This record should include an historical summary of what has been attempted and achieved so that future generations of mission staffers and its partners will better understand the background.

Fully Engaging All Stakeholders

There is a need for a clearer picture of the relationship between issues related to the efficiency and effectiveness of the wood industries and their overall development potential with the principles of sustainable forest management. Honduras is another wood-rich country importing wood from the United States!

Economics of Forest Management

Despite years of work on the key economic issue of real pricing of the forest resource base, which was one of the important achievements of the project, there is as yet too little sense of the economics of the costs and benefits of sustainable pine forest management practices and investments. For example, the World Bank–funded PAAR (*Proyecto de Administración de Áreas Rurales*) is proposing to subsidize cleaning of natural regeneration of pine forest areas—an investment that adds to the costs of management and is probably unnecessary. Long-term economic sustainability would best be guaranteed with a capital investment model that yields attractive returns for forest owners and operators (microeconomic issues) and an overall approach that measures costs per unit area treated against the magnitude of the pine forest resource base to the government for administering the system across the board (macroeconomic issues).

Tenure Security and Long-Term Investments

The potential for the development of natural forest management would be strengthened by clarification of land tenure and property rights issues. This remains a persistent problem, with squatters' claims on forest lands, the random introduction of cattle, and the blackmail of the threat of setting fires—a constant concern.

Forestry Management Is Best Practiced in the Field

Supervision of forest operations appears to be inconsistently applied. The standard practices of reduced-impact logging were not used in the one operation that was visited; breakage, damage to the residual stand, and waste in the forest seemed excessive.

Fuller Use Models

Logging residue left on the ground should be used through direct sales to local people. Additional income for the local community could be realized through salvage operations following timber sales and the development of minor or non-timber forest products as part of more intensive management.

Keeping the Pressure on in the Policy Arena

Technical assistance on forest management technologies and systems that do not work at the policy level—both dialogue and reform—will lead to lackluster results and demoralize those participating. Although the mission has withdrawn its support (justifiably so because of the political interference in the operations of COHDEFOR), it will eventually have to re-table those discussions if its promising investments in sustainable forest management are to be fully used in the future.

Capable Human Resources Are Fundamental

Training of COHDEFOR personnel and technical assistance was an important part of the Forestry Development Project and a significant achievement that helped bring about the major change in organizational culture. Professional foresters, many trained at the graduate level in the United States, and forest technicians, produced by ESNACIFOR, provide the trained technical cadre needed for natural forest management.

Natural Resource Management Principles

USAID/Honduras is considering shifting the focus of its program to the important topic of watershed stability because of the linkages between overall national development potential and optimal use of water resources for hydropower generation, potable water supply, irrigation, and industrial development in general. Watershed improvement achievements will depend on a sound program of natural resource management, which may be defined as “matching land use to land capability.” Because of the inherent ecological limitations in the highlands of Honduras, sustainably managed pine forests will continue to be the predominant land use for these areas, which constitute the watersheds for its major rivers. While the pine forests are technically relatively easy to manage, forest practices in the steeper elevations will require careful planning and supervision. The achievements of the Forestry Development Project in developing sustainable pine forest management approaches and technology will continue to have broad applicability as the mission shifts its focus to watershed management.

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Appendix G. Peru

The tropical forest areas of Peru anchor the special southwestern arc of the Amazonian forests, starting in the south in Bolivia and swinging north and east into the Brazilian states of Arce and Rondonia. Protected by the embrace of Andean mountain ranges and narrow valleys, the rushing river tributaries of the Amazon (the Marañon, Ucayalli, and Huallaga) on the west and the vast expanse of the Amazon lowlands to the east, this area has remained relatively intact up to modern times. Standing on the salient of the Inca fortress city of Machu Picchu, one can readily understand how the rugged topography of steep ridges and deeply incised river valleys of the *ceja de la selva* (“eyebrow of the jungle”) have served to deter the development of this area and the lowland forests immediately adjacent to it. This combination of steep lands, large rivers, and the interplay of high rainfall, soils, and abrupt altitudinal changes has also given rise to a wide variety of ecosystems and habitat that still harbors a treasure trove of unique biological diversity.

In the 1960s, during the first presidency of Belaunde Terry, government planners began to look at the possibilities of colonization programs to alleviate the poverty of its peoples living in the harsh mountain and coastal areas of the country. Opening roads into these unpopulated areas to spur colonization “was the main thrust of central government policy for the Peruvian Amazon for many years” (Southgate and Elgegren 1995). There was little consideration for the sustainability of agriculture or for the fragile nature of this area’s ecology, with rainfall up to 6,000 mm per year and acid soils of low fertility and high erodability. Roads were expected to make it possible to exploit what was thought to be the rich concentrations of timber, non-wood forest products (rubber and Brazil nuts), and energy and mineral resources present in the area. Even less regard was shown for the rights of the indigenous peoples who traditionally occupied these areas and survived at relatively low population densities (after their numbers were depleted by the epidemics spawned during colonial times) as hunter-gatherers and slash-and-burn agriculturalists. The attitudes taking shape during the 1960s, 1970s, and 1980s have been characterized by some as the second coming of the *conquistadores*.

Access, transport, colonization, and indigenous rights remain key issues for appropriate and productive development and land-use today in this vitally important area of the Amazon.

1. Forestry Sector Overview

Within its borders, Peru harbors the fourth largest area (67.4 million hectares) of tropical forests in the world, after Brazil, Congo, and Indonesia. (SOFO 1999). Representing more than half of its total land area of 128 million hectares, this area is even more remarkable considering the large expanse of the country that is either treeless desert or high mountains. FAO estimates that the annual loss of forest area is about 200,000 hectares per year, much of which is taking place on the lowland areas of the southwestern Amazon. Of even greater concern is the persistence of forest degradation driven by illegal selective logging, often taking place on steep or fragile lands. Table G.1 provides some recent statistics on forest cover and its situation in Peru.

Table G.1 Recent Forest Cover Statistics for Peru

Total land area (thousands of hectares)	Total forest cover 1990 (thousands of hectares)	Total forest cover 1995 (thousands of hectares)	Total change 1990–95 (thousands of hectares)	Annual change (thousands of hectares)	Annual change (percent)
128,000	68,646	67,562	-1,084	-217	-0.3

Despite the pace of deforestation, Peru must still be considered a country with high potential for forestry sector development based on the rational exploitation of its immense tropical forest resource base. Table G.2 summarizes a recent summary of the actual area of tropical forests.

Table G.2 Present Area of Tropical Forests in Peru by Department (hectares)

Department	Forest area	Percent of total	Department	Forest area	Percent of total
Amazonas	1,792,494	2.7	San Martin	3,265,987	4.9
Loreto	34,966,641	51.9	Junin	1,555,624	2.3
Ucayali	9,413,722	13.9	Huanuco	1,653,989	2.5
Cuzco	2,936,334	4.4	Pasco	1,547,160	2.3
Madre de Dios	8,343,479	12.4	Puno	1,280,806	1.9
Other Depts.	549,967	0.8	Total	67,306,203	100.0

Source: *Vision Forestal*, Working Document, BIOFOR Project 2001.

Approximately 60 percent (40 million hectares) of the total tropical forest area is considered to be potentially productive, while the remainder (27 million hectares) should be kept as protection forests, many of which are already so designated. Like many of the tropical forests in this region of the world, Peru's forests contain an array of species with different commercial value on the world market. The higher-valued species make up a relatively small percentage of the standing volume and include: mahogany (*Swietenia macrophylla*), Spanish cedar (*Cedrela odorata*), ishpingo (*Amburana cearensis*), and tornillo (*Cedrelinga catenaeformis*). A variety of other important commercial species of medium value but occasionally occurring with more frequency, include: copaiba (*Copaifera officinalis*), catahua (*Hura crepitans*), cumala (*Virola spp.*), lupuna (*Chorisia spp.*) and panguana (*Brosimum utile*).

Although 195 species are harvested, 14 species constitute almost 90 percent of the total volume extracted from the forests each year. Peru's wood industry is concentrated in sawmills that consume approximately 80 percent of the annual cut, which ranged from 1.2 to 1.8 million cubic meters from 1996 to 1998. Plywood production, sliced decorative veneer for furniture manufacture, parquet flooring, and railroad sleepers are the other major categories of products for which this timber is used. The industry has an installed capacity of approximately 2.5 million cubic meters input per annum but is still operating well under capacity due to supply limitations in the flow of logs and timber from the forests. Many of these species, and others, and the industry that uses them, form the basis for a reasonable wood industry export flow from the

country. During 1996–98 forest industry exports totaled about \$90 million, of which, interestingly, about \$30 million were in non-wood forest products (perfume bases, glues, resins and vegetable extracts, palm hearts and Brazil nuts, and vegetative reagents for coloring and tanning).

During the 1990s, Peru made significant progress in updating and improving the policy and legislative framework for environmental management. The National Natural Resource Institute (INRENA) was established in 1992, bringing together all the former national agencies involved in management of natural resources. In 1998 a law (No. 27037) was passed to promote investment and integrated, sustainable development of the Peruvian Amazon. This law provides a series of incentives and tax reductions for forest industry development. In July 2000 a new Forestry and Wildlife Law (No. 27308) was enacted to promote sustainable use of forestry resources and the participation of the private sector. New laws and procedures for the protection of biodiversity were also enacted in 1996 and, as a result, about 10 million hectares of tropical forests have been put under protection.

The new forestry law requires management plans for all new timber extraction concessions. Before then, all timber extraction was carried out under relatively short-term permits (1–2 years) or limited area contracts (1,000–25,000 hectares maximum). Since the passage of the new law, the government has decided to establish a facility for granting longer-term timber concessions. The Commission for the Promotion of Private Investment (COPRI) has established a special committee to begin the adjudication of the first of these concession contracts in the area of Biabo-Cordillera Azul, located in the north-central part of the Amazon Region in the Departments of Loreto and Ucayali on almost 800,000 hectares. Twenty-five areas of 22,000–40,000 hectares will be opened for bids on concession contracts of 40 years' duration.

Another important and more recent achievement is a decision by INRENA to allow for the establishment of protected areas to be managed by the indigenous communities found living there. This project, funded by the GEF through the World Bank, is intended to bring five protected areas in the Peruvian Amazon under management and administration by indigenous communities belonging to a variety of local ethnic groups. This project is a follow-on companion to recent achievements in providing land titling for indigenous groups to register their land rights within their traditional territories.

2. USAID/Peru's Investments in Natural Forest Management

USAID/Peru was one of the first missions to become involved in natural forest management, and the origins of the Central Selva Resource Management Project are an interesting example of the debate at the time about the development of the tropical lowlands. In 1980, when President Belaunde returned to power after ten years of military dictatorship, he presented the country and the development community with the Pichis-Palcazu Special Project. The early objectives of this national project were to build a road into the Palcazu Valley and establish a wood industry and settle a large number of colonists there. USAID, interested in supporting the return to civilian government, agreed to provide funding for the project. An early grant for the road-building and proposed design soon found many critics, especially among the Yanasha indigenous peoples of the valley and development agents working with them, who pointed out the negative social and environmental effects.

Heeding this criticism, USAID undertook a serious redesign effort, which led to the Central Selva Resource Management (CSRSM) project and its components. These included establishment and management of a protected reserve, a system for sustainable timber exploitation and forest management (the NFM component), sustainable crop and livestock extension services, and the enhancement of public health services in the Valley and adjacent areas (Southgate and Elgegren 1995). Intense interest in human rights at the time prompted the USAID mission to include a condition precedent requiring the titling of Indian community lands (Moore 1989).

Not surprisingly, the implementation of the CSRSM Project was a rocky road from start to early finish for a number of reasons. At the outset, there was little apparent conviction and commitment among the government of Peru personnel, especially at the higher level, to the social and environmental sustainability approach. Moore (1989) reports, “There were constant pressures to revert to a traditional road and pork barrel public works construction project which would have made colonization a priority over sustainable natural resource management.” It was also a complex project taking an integrated approach to appropriate land-use and social development in the midst of a highly charged struggle between indigenous peoples and the forces for colonization. Regrettably, USAID was forced to withdraw the technical assistance team and effectively shut down their involvement in the project in 1989 as a result of security concerns linked to incursions by the Sendero Luminoso in the area.

Despite its difficulties, the CSRSM Project resulted in considerable achievement in forestry and natural resource management. The most significant was the development of the Yanasha Forestry Cooperative, which put the local community directly in charge of the sustainable management of the forest lands titled in their names. This plan involved an extremely innovative method of strip harvest of the forest and value-added processing and saw milling on site. In addition, the 122,000-hectare Yanachaga-Chemillen National Park and the 145,818-hectare San Matias–San Carlos protection forest were established to further stabilize the land-use pattern.

After much struggle, land titling was completed for almost all the Yanasha communities of the Palcazu Valley, and the project assisted them with boundary surveys, soil surveys, and land capability classification to ensure an understanding of the potential and constraints to the development of these lands. The Yanasha Communal Reserve was also established and now serves as a hunting preserve and buffer zone for the fragile steep areas adjacent to the National Park.

Currently, the Proyecto Especial Pichis-Palcazu receives USAID support and technical assistance from the alternative development resources available to Peru as part of the effort to halt coca production. These activities include the extension of the road from Iscozasin to Puerto Mairo and a contract with Winrock and Pronaturaleza, a local NGO, for community forestry, ecotourism development, and production and marketing of non-timber forest products—in particular, *Uña de Gato*, a traditional medicine made from the bark of a vine common to the forests of the area.

Since the early 1990s, Peru “has made significant progress in development of a national environmental policy and institutional framework,” and USAID has continued to assist with activities in the sector (USAID 2000). This assistance was elevated to the status of Strategic Objective (SO) No. 4 in 1995—“Improved Environmental Management in Targeted Sectors.”

USAID assistance on the natural resources or “green” issues under this SO have included the Sustainable Environmental and Natural Resources Management (SENREM) and the Biodiversity and Fragile Ecosystems Conservation and Management (BIOFOR) activities.

The SENREM activity began in 1996 and its SO Grant Agreement has a current completion date of September 2003. Much of its work is with the National Environment Council (CONAM) and it has been instrumental in recent years in improving the policy and legislative framework for environmental management. The activity has four components:

- A legal, regulatory, and policy framework “designed to assist in the improvement of Peru’s environmental laws and policies and to strengthen the capacity of CONAM, related GOP sector ministries, and other public sector environmental organizations.”
- Private sector advocacy “designed to strengthen the private sector’s capacity for consensus building, problem-solving, and environmental policy dialogue.”
- Pilot demonstration projects designed to “test and validate innovative environmental technologies and practices by private sector organizations.”
- The main thrust of implementation for the last few years, clean and efficient production, which will “create a clean production center for industry, strengthens environmental management of the Ministries of Industry, Fisheries, and possibly Energy and Mines...assists the fishmeal industry to reduce pollution...and established a revolving fund or a loan guarantee scheme for environmental audits and small demonstration interventions” (USAID 2000).

Implementation of the BIOFOR activities began in October 1998, and will four-year life through September 2002. The activity is designed to:

- “Address policy issues that constrain environmentally sound and sustainable management of Peru’s biological diversity and fragile ecosystems, particularly tropical forests, through technical assistance to appropriate GOP agencies.”
- “Assist INRENA in developing its capability to provide leadership in policy improvement and implementation, and management of Peru’s biologically diverse, fragile ecosystems and forests.”
- “Train local public and private institutions in strategic and financial management to facilitate improved site-based conservation and sustainable management and monitoring of biologically diverse sites and fragile ecosystems.”
- “Provide grants to selected private sector organizations that develop training and innovative pilot management approaches” for these areas.

The BIOFOR activity has also been a mechanism to enhance Peru’s participation and cooperation with neighboring countries of the Amazon Basin, notably Bolivia and Ecuador, on biodiversity conservation and tropical forest management. Particularly noteworthy is a working

relationship established with assistance from BIOFOR between a U.S.-based export/import business, a local wood industry, and community-based producers as an effort to create greater synergy between producers, industry, and the marketplace.

3. Issues and Opportunities

Experiments with Natural Forest Management Take Time

The Central Selva Resources Management Project was clearly an experimental pioneer effort to link local community development for indigenous peoples with sustainable forest management. Unfortunately, and despite its many achievements, its slow start-up and untimely demise did not allow adequate time and efforts now generally considered necessary for projects of this type to fulfill their objectives. Experiments of this nature also need more flexibility and a greater time frame to achieve their objectives but must be carefully monitored so that changes in design and execution reflect (and record) causes and effects and ensure that the lessons learned are perceived by all concerned.

Roads, Rules, and Realism

The present condition of the road from Villarica to Iscozasin makes rational forest management (and many other production systems) difficult because resulting high transport costs erode the potential for forest management-related investments. Badly made roads such as this one, which has wholly inadequate drainage structures despite very high rainfall (5,000 mm and above) in the area, are not developments; they are economic, social, and environmental liabilities.

Although the upper reaches of the Palcazu Watershed were formally identified by the land capability planning methods of the Central Selva Project as protection forests (*bosques de protección*), use restrictions are not being respected nor enforced. INRENA seems incapable of dealing with large number of small-scale logging operations that are cutting small logs on the steep slopes (sometimes almost vertical, frequently over 60 percent) of the upper watershed and dropping them on to the access road by chute (*botadero*) or walking them down existing drainage ways (*quebradas*). This is causing erosion on the slopes and damage to the already poorly drained road surface, thereby defeating the zoning achievements of the earlier project. These “protection forests” have no apparent owner and are being treated as open-access resources. Since government has only limited capacity to monitor and manage them, they may actually engender more degradation.

Ironically, illegal logging and unsustainable logging (two different concepts) actually increase costs, contributing to the deterioration of a poorly made road as *botaderos* channel water and mud onto the badly designed surface. Because of the difficult road conditions, which delay and damage trucks extracting timber, loggers must look for every way possible to cut costs—high-grading the forests and paying minimal amounts to the local people who extract timber, thereby degrading the forest and limiting the development of the local economy. Over the short- to medium-term, the degradation within the protection forest’s area will most likely lead to watershed instability. The rivers will become more torrential (higher floods, lower lows) and will further exacerbate the condition of the road as they eat away toe-slopes, causing landslides that destroy the roadbed.

Natural Forest Management—An Option for Alternative Development

As an alternative agriculture strategy, opening roads into primary forest areas will be considerably undermined if illegal logging takes place as a result. These activities are, in effect, undermining the real alternative development potential of the area, which, because of land capability limitations, should be managed for sustainable forest management.

USAID/Peru may wish to consider strengthening the current mitigation requirements associated with road-building activities between Iscozasin and Puerto Mairo, financed by the alternative agriculture program. Reforestation along the road margins (2,000 seedlings of Tornillo per km of road) make little sense and would not be necessary to mitigate the impact of opening up primary tropical forest areas, as is happening, if there were a requirement for forest management planning and implementation for the area through which the road will pass. This was the recommendation of a recent environmental review of road upgrades implemented under the alternative agriculture program in the Chapare of Bolivia.

Linking Primary Producers, Industry, and the Marketplace

The present activities of WWF/Peru with the private sector (Fundación South Cone) to generate synergy among producers, industry, and markets makes good sense and has led to a positive working relationship that is giving back to the sector and society (particularly local communities).

Observations and follow-up evaluations clearly demonstrate that clear-cutting in 30-meter strips will work; excellent regeneration of natural forest has taken place in the strips, with both high diversity of tree species and high numbers of seedlings per hectare (Pariona 1992). The overall feasibility of the system was dependent, however, on the possibility of marketing all of the timber extracted in a variety of product formats (timber, treated poles and posts, charcoal). Although project design and execution considered the marketing of these projects, it appears that investigations of market potential were inadequate or unrealistic. Supply looking for demand often finds poor leverage in the marketplace.

Incorrectly matching a forest to be managed with a product or mix of products to be marketed can seal the financial fate of any natural forest management activity. The choice of the very political, technically demanding, and large-scale treated utility pole market for the treatment plant at Shiringamazu, to be served by an isolated community with very small-scale production, provides a powerful lesson. Increasing the value of the highly heterogeneous and occasionally picked-over forests of the Central Selva and other accessible areas in Peru will require a much closer and effective networking between a wide range of producers and enterprises along the forest to market continuum. Strengthening the producer associations thru priority services, for which they can and are willing to pay, should be an important component of assistance in natural forest management.

Similarly, increasing the costs of producing a product for a marginal marketplace, as so often occurs with well-funded and well-intentioned development projects in many sectors, is not a viable strategy. There is a chance that the present efforts to produce and market *Uña de Gato* may suffer a similar fate, especially considering the fact that there are other agents producing this

non-wood forest product without incurring any investment costs or attempting to extract it with management controls.

Indigenous and Community Forestry Enterprises—A Challenge but Worth Pursuing

Pronaturaleza, the NGO currently working with the Yanasha Community Enterprise (*Empresa Comunal de Servicios Agropecuarios*) believes that transparency among the members of the enterprise is fundamental to its eventual development as a working entity. Transparency means both responsibility and accountability for the planning and implementation of the activities of the enterprise, but this must also be applied, perhaps even more rigorously, to the NGO, the donors, and the technical assistants working with these communities.

Returns from investments in training and organizational development are notoriously difficult to see, track, and evaluate. A local leader, trained by the original Pichis-Palcazu Project (CSR Project), formed the current association of cooperatives for marketing *Uña de Gato* and ecotourism services. This is a significant and recurring impact of that project.

Building Capabilities for Implementing the New Forestry Law are Essential

The new Forestry Law makes it obligatory to have in place forest management plans as a prerequisite for harvesting. However, demanding compliance with these conditions in the face of chronic institutional inability to enforce or even service the demand for forest management planning simply reinforces a preference for illegal activities. Those who might wish to comply probably cannot presently obtain technical assistance from INRENA, nor can they have their management plans expeditiously reviewed, approved, and monitored.

Continued progress and the eventual success of the process for natural forest management concessions permitted under this law, for example, in Biabo; the continuing evolution of the legal reforms; and institutional development within the forestry and protected area sectors will require a high-level umbrella steering mechanism. It will also require significant and effective participation of civil society.

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